STAFF WORKSHOP

BEFORE THE

CALIFORNIA ENERGY RESOURCES CONSERVATION

AND DEVELOPMENT COMMISSION

In the Matter of:	)
	)
2005 BUILDING ENERGY EFFICIENCY STANDARDS PROJECT SCOPE, SCHEDULE AND PLANS	)

CALIFORNIA ENERGY COMMISSION

1516 NINTH STREET

HEARING ROOM A

SACRAMENTO, CALIFORNIA

THURSDAY, NOVEMBER 15, 2001

10:00 A.M.

Reported by:
Ken Moore
Contract No. 150-01-005

COMMISSIONERS, ADVISORS PRESENT

Arthur Rosenfeld, Commissioner

STAFF PRESENT

William Pennington

Bryan Alcorn

Jon Leber

Elaine Hebert
Northern California Solar Energy Association

Mazi Shirakh

ALSO PRESENT

Charles Eley
Eley Associates

Bruce A. Wilcox
Berkeley Solar Group

Noah Horowitz
Natural Resources Defense Council

Robert E. Raymer
California Building Industry Association

Tony Pierce
Gregg Ander
Southern California Edison Company

Lance DeLaura
The Gas Company, A Sempra Energy Company

A.Y. Ahmed
Occidental Analytical Group
Consultant to Southern California Gas Company

David A. Springer
Marc A. Hoeschele
Davis Energy Group, Inc.

Ken Nittler
Enercomp, Inc.

ALSO PRESENT

Patrick Eilert
Marshall Hunt
Gary Fernstrom
Pacific Gas and Electric Company

Douglas Mahone
Nehemiah Stone
Jon McHugh
Heschong Mahone Group

Michael Hodgson
ConSol Energy Consulting
representing California Building Industry Association

Bill Mattinson
Sol-Data Energy Consulting
California Association of Building Energy Consultants

Thomas L. Trimberger
California Building Officials

Dave Ware
Owens Corning
representing NAIMA

Michael S. Day
Beutler Heating & Air Conditioning

Steven D. Gates
James J. Hirsch & Associates

Len Zola
Superior Radiant Insulation

Ronald J. Akers
Advanced Foil Systems, Inc.

Hasheem Akbari
Lawrence Berkeley National Laboratory

John Proctor
Proctor Engineering Group

Ray Bjerrum
Merzon Industries
Western Region AAMA

ALSO PRESENT

Frank A. Stanonik
Gas Appliance Manufacturers Association, Inc.

Robert Hutslar
Laing Thermotech, Inc.

Ed Stahl
Sunworks Structural Insulated Panels
representing Structural Insulated Panel
Association

Bob Turley
ATI Architects

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P R O C E E D I N G S

10:00 a.m.

MR. LEBER: I'd like to welcome everyone today. This is our second set of workshops for the 2003/2005 standards development project.

I am Jon Leber. Bill Pennington has been called away to a different meeting for awhile; he will be able to join us later. Brian Alcorn, who is on my left, is contract manager for the major contract on this project. Bill is the project manager for the overall standards project.

We should have some representative of the Commissioners' Office; we expect them to be joining us somewhat later.

The purpose of this meeting is to review and discuss residential standards change ideas that were proposed to the Commission.

The agenda today has a pretty tight timeframe. We're required to make people to make their comments as brief as possible. The agenda that we've proposed has specific times for each of the formal presentations, and then there's a time for comments at the end of that. We want to have people hold their comments until the time is identified for questions and comments on the

agenda.

These change ideas or templates that have been submitted to the Commission are developed by the Commission Staff and their contractor.

The agenda is organized by topics to allow a brief amount of time for those people who have submitted ideas on the templates.

We plan to hold to the schedule. We'd appreciate people finishing their statements in less time than allotted if they possibly can do that, recognizing that's going to be pretty tight.

When we get to the time period for having questions or comments it would be very helpful, I think, to have those who want to make questions or comments to kind of line up here at the podium so we can have some sort of a sense of how many people are actually wanting to speak and the time period, and give us some idea of how much time each person, you know, can reasonably be allotted.

In making comment we would certainly appreciate that everyone stays very cordial, even if you have disagreements with either the proposers or other people's comments.

Copies of items being discussed are on the table at the entrance to the hearing room. Please sign in if you're here, if you want to speak or make any presentations. Please provide a card to the recorder so that -- if you're planning on speaking. And please use the microphones, which I tend to sometimes miss, too. It gets lost off the record if you don't get close enough to the microphone to be heard.

So, I see that Commissioner Rosenfeld joined us, but prefers the audience to the table in front.

(Laughter.)

MR. LEBER: I will take that to mean that you don't have anything you want to say, Commissioner?

COMMISSIONER ROSENFELD: Welcome.

MR. LEBER: Thank you. On the sign-in sheet it would probably be helpful if you have a business card, also attach that to the sign-in sheet so that, you know, we have a really good idea, just in case we can't read your handwriting.

If it turns out that there isn't sufficient time to make comments today, we're accepting written comments through November 23rd.

And so feel free to put something in writing and send that to us.

With that I'd like to move to the first presentation which is by our CEC contractor, Charles Eley, who is to my right here.

MR. ELEY: Time dependent valuation is something that's on the CEC list, but it's also something that's one of the PG&E proposals. And I know Doug Mahone will be presenting a lot more details on this in a moment.

The Energy Commission and their contract team considers this an important topic. It affects both residential and nonresidential standards. What it really is is an alternative to source energy as the currency for evaluating building energy performance. Source energy has been used since the beginning of the standards.

TDV assigns greater value to energy that's used during peak periods when electricity prices are higher. So what we really have is a, where with source energy we have a constant multiplier of three times electricity, with TDV that multiplier would vary for each hour of the year, and for each climate.

And it would encourage buildings to

incorporate features that address peak energy. It would give more credit to buildings that reduce peak energy as opposed to energy during offpeak periods.

It would be implemented primarily as a modeling change. The users of the MICROPAS and ENERGYPRO, CALRES would really not see the difference. It would be, the operation of the program would be essentially identical. It's just that underneath the hood the calculations would be done differently.

The TDV rules would also, of course, need to be documented in the residential and nonresidential ACM approval manuals; and there's a couple places in the standards it would also need to be changed.

So that's all I have to say about that.

MR. LEBER: Thank you, Charles. The next person is HMG. Who's representing HMG today?

MR. MAHONE: I will be; my name is Doug Mahone from the Heschong Mahone Group. Getting my slides up there.

While he's bringing those up, I'm representing a project team that has been working for PG&E with additional support from The Gas

Company, Southern California Edison and a fair amount of support in the initial stages of this project from the Energy Commission, as well.

This is actually a proposal that we've been working on for about two years to improve the foundations of Title 24.

Just to sort of continue on the points that Charles was just making, the implementation of TDV will essentially be transparent in the compliance process. The end user will not really see any of the guts of the analysis, except as it comes out in the wash at the end.

The clients tools that are currently used for performance approach, both the residential and the nonresidential ACMs, would have the time dependent valuation stream of values embedded in them. And they would be applied to the hourly savings.

So, for each hour where there's a savings calculated between the proposed design and the base design there will be a certain energy value of those savings that's calculated as it is now.

At that point an hourly TDV value would be applied. And those would simply be added up

over the course of the year. So it would be transparent to the users.

One of the fundamental assumptions we made in developing TDV was that the stringency of the standards should not be relaxed beyond what the current standards were, which were essentially the '92 standards, although there have been some modifications made since the '92. But the fundamental economics of the standards were set in '92.

And so we took the overall stringency of the '92 standards as one of our basic assumptions that we wanted to keep that constant.

And as Charles mentioned, the result is that we'll have more credit given to measures that perform well onpeak versus measures that don't perform so well onpeak.

This will have building-by building implications in that it gives signals to designers on how to design their buildings to perform better during onpeak conditions. But over the long term, as the building stock in California is transformed on a building-by building basis, the overall demands on the energy system in the State of California will go down.

This will reduce system demand costs, which, of course, from the past year's experience, we're all acutely aware of. And it will reduce costs to everybody in the state.

Next slide, please. Now, this red line that you see here, the flat line, is essentially the way the current standards value energy. There is a flat value for savings. It's constant throughout the course of the year. And if you were to stretch this out in this example over the course of a week, but in fact if you were to stretch it out over the course of a year, which is how the analysis is typically done, it's simply this flat line.

Now, we know that this is wrong. Energy is not equally valuable on a Sunday afternoon or on a Wednesday in the middle of the day.

So, what we have is a time varying shape in the value of energy. It's more expensive some hours, it's less expensive than average on other hours.

And this is a lot closer to the reality of what the system throughout the state experiences in terms of the value of energy for some consumers who are paying on a time of use

rate. It also actually is fairly close to what their rate is.

But we're not trying to base this on rates, we're trying to base this on the value of energy. And we're trying to come up with a basis within Title 24 for valuing energy that has this kind of shape characteristic to it, instead of the flat line, which we know is wrong.

Next, please. So, the way we developed the time dependent valuation, we needed a rational basis to come up with this shapiness, the kind of peaky-ness of the profile, as opposed to the flat profile.

So we started out, as I mentioned, with the total stringency of the '92 standards, which in this case essentially translates to the total annual energy costs that were assumed when the valuation of energy was established in '92.

Next. So we started out with a forecast for the generation components of electricity which have a clear shape to them. Higher cost during peak hours; lower cost during offpeak hours. We added in a factor for transmission and distribution which is also very peaky at its nature. Transmission distribution costs primarily

occur during peak events, a very few number of hours of the year actually determine the needs for the capacity of the transmission and distribution system based on the peaks that occur during those hours.

Next. Then we added in a flat adder which basically brings this valuation up to what the current rates are. And this reflects the fixed components of a rate, the cost for the metering, the billing and all the taxes and stuff that go in there.

Next. We also added in a shape for environmental externalities, because the plants that operate during peak hours put out more pollution than the baseload plants. And they provide another way to add some shape to this load.

And then finally we put in what we're calling a 1992 adder, which basically trues everything up to the value of energy that was used in setting the '92 standards. And that's how we prevent this new scheme from essentially reducing the total stringency of the standards.

So, as I say, this is basically a mechanism to put some shape to the value hour by

hour that we assign to energy savings under the standards. We can go into extraordinary detail on almost any one of these because we've been researching this for a couple of years.

But the net area under the curve, by the time you add it all up over the course of the year we're essentially holding constant. You know, we could argue about whether, for example, the environmental externality was done right. Might change the shape of the curve a little bit, but unless we change the fundamental assumption about the stringency of the standards, it actually wouldn't affect the area under the curve.

Next.

MR. HODGSON: Doug, before you leave that, what's the horizontal axis on that slide?

MR. MAHONE: Time.

MR. HODGSON: Over what -- is it a week?

MR. MAHONE: Each one of these peaks would be a day, so this is about a week.

MR. HODGSON: Okay, with no Saturday and Sunday?

MR. MAHONE: No, this is just a weekday, I think. We just picked a kind of typical five days. It would --

MR. HODGSON: So Monday through Friday?

MR. MAHONE: Yeah, this would be like a Monday through Friday curve.

Okay, so on the next slide, people are curious about how this breaks out over the course of a year. And it does vary a little bit by climate zone and by whether you're talking residential or commercial.

But what you see down here is on the bottom about a -- in this one that we've pulled out, about a third of it on the bottom is the true-up to the '92 standards. The purple part, the 8 percent, is the rate adder. The generation is a big component of it, about 34 percent, TDV about 21 percent. And then this environmental factor that we've created is on the top with a few more percent.

Next slide, please. So, similar process was undertaken for gas. Again, our target was the total annual energy cost for gas from the 1992 standards. The commodity cost has some shape, some seasonal shape. It's cheaper in the summer than it is in the winter.

Next. We've got a flat adder for the rates. A flat adder for an environmental

externality. And finally an adder for natural gas to bring it up to the '92 standards. And so again the area under that curve is equivalent to the area under the flat curve that was used in setting the '92 standards.

Next, please. So how's this going to affect practice? For either residential or nonresidential, the ACM or the computer simulation tool that's used for performance calculation would do as it does now. You would put in your proposed design. It would automatically generate the basecase runs.

Then from those, from the difference between those two runs you generate an hourly savings value. And that hourly savings for each of the 8760 hours of the year is multiplied by the hourly TDV values, which are taken off of those up-and-down curves that I've just been showing you. So savings that occur during a peak time would be given more value. Savings that occur during an offpeak hour would be given a lesser value.

So for measures that perform better during onpeak periods they would be given somewhat more credit than other measures that might not

perform as well during those onpeak hours.

For measures that save their energy all throughout the year, for example insulation products pretty much saving during heat and they saving during cooling, they save in the night and they save during the day, they're going to essentially get the same kind of credit that they do under the current standards, because the area under the TDV curve is equal to the area under the old flat curve, and --

MR. LEBER: Doug, can you wrap it up?

MR. MAHONE: Yeah, I'll wrap it up. Okay, let's move on to the last slide finally.

Along with the economics we have some calculations that we have to perform because the models have to be able to do hourly calculations of savings.

For example, we want to be able to distinguish between HVAC units that perform well onpeak and those that don't. We also want to be able to distinguish water heating, ducts and attics and all the other measures.

On the residential model therefore we have to put in an hourly HVAC modeling capability. And we've developed a mechanism for doing this.

We have a spreadsheet model of how that can be done that the people can look at and can play with. But, as I say, it will ultimately be transparent to the users.

Next one. The final one is some details about how we would do the HVAC performance. Do I have time to go through this or am I getting --

MR. LEBER: You're already over time by a couple minutes.

MR. MAHONE: Over time, okay. Well, we don't have time to go into the details, but it's briefly laid out here on the slide and I'll be happy to answer any questions during the discussion.

One more slide real quick. I just want to point out that there's a website that has all the project reports and the research and these evaluation tools and the prototype spreadsheets that's available. So anybody who wants to look into the details can go to this website.

Thank you.

MR. LEBER: Next person is gas cooling. Who's speaking for that?

MR. SPRINGER: David Springer, Davis Energy Group.

MR. LEBER: David, you need to get to a microphone, please.

MR. SPRINGER: We've been working with Southern California Gas to identify what gas cooling technologies are available currently, and how they stack up under a TDV scenario.

It's fairly clear that from Doug's slides that well, electricity prices change hour to hour; natural gas only fluctuates on an annual basis. And we hope that won't change in the near future.

While they're getting my slides together there, I'll launch into a description of what we're doing with the technologies.

We've identified basically two residential technologies and two commercial technologies, which are now prevalent -- not prevalent, but existing in the marketplace. And with a bit more favorable treatment they probably will be more prevalent.

The residential technologies include gas engine heat pumps. There is currently one Japanese manufacturer on the market; there was a U.S. manufacturer who just slipped off. There's currently no compliance methods for that existing

equipment. There was a compliance method developed for the U.S. manufacturer of a gas engine heat pump, but since it's no longer available, it's a moot point.

Gas absorption air conditioning. There are two U.S. products on the market, and again no compliance methods for demonstrating compliance.

Nonresidential technologies, double effective gas absorption chillers are widely available. There are nine U.S. manufacturers, and while a compliance method isn't documented, it is possible to perform compliance using engineering judgment. We hope to improve that situation.

Gas engine chillers, there are six U.S. manufacturers. And, again, there's no compliance option documented in any of the standards documentation.

The markets for these technologies include residential single- and multifamily and offices, institutional and manufacturing. Basically any building that gets heating and air conditioning.

Next slide. Benefits of gas cooling primarily include elimination of compressor peak demand, since there's no compressor, at least no

electrically driven compressor. There's a substantial reduction in peak demand.

Source energy savings at the old 10.239 conversion factor is similar or somewhat higher than comparable electric power systems. However, with the application of TDV, source energy may be significantly lower than for electric driven systems. And we're seeing a possible twofold increase in PV savings compared to the current flat approach for compliance.

There's lower net emissions because there's less source energy consumed. And some of the technologies use non ozone depleting refrigerants.

There's a tremendous potential for operating cost savings on time of use and demand rates, which is another benefit.

So the next steps that we're proceeding with are to evaluate performance and cost data that we requested from the 19 manufacturers we've identified. And we're compiling that data and developing standardized performance variables that we can use to plug into TDV models to see how gas cooling stacks up.

And ultimately we'll develop compliance

options and improve the ACM manuals and how they treat gas cooling.

MR. LEBER: Thank you, David. We're now ready to move to the questions and comments about time dependent valuation. How many people do we have who want to comment? Three, four, five. If you could all stand up. Okay, four or five.

Why don't we start with the people who are in the audience in the back and come up and line up at the podium if you could.

MR. AKERS: Ron Akers with Advanced Foil Systems. I'm sorry I didn't catch your name, HMG --

MR. MAHONE: Doug Mahone.

MR. AKERS: Doug Mahone. My question would be how would TDV calculate performance by individual building components? Basically how would you determine what components would work better than others under your study?

MR. MAHONE: Well, the answer is pretty much the same for both residential or nonresidential, except that currently the residential models don't have a good hour-by-hour equipment model.

Part of our proposal is that you have

hourly simulation capability for the building. For measures that the current programs have the capability to model, it basically distinguishes them by the hourly performance of the measures.

We have included some research into adding an attic and duct model to the residential ACM which is included in our prototype spreadsheets. But it's somewhat of a simplified model.

There's potential for people that want to get better recognition of measures that are not currently well modeled, you know, to follow the normal procedure, you know, proposing improvements to the ACMs so that they can do a better job of modeling.

MR. AKERS: And one more quick question. Have you had any outside input from various manufacturers on data? Is this something that you've looked for or how these various components work that you may not be too familiar with?

MR. MAHONE: Well, other than adding an hourly equipment model to the residential and adding a duct and attic model and adding hourly water heating, we haven't delved further into the details of how other systems are or are not

modeled under the ACMs. We'd be happy to have that kind of feedback.

MR. AKERS: Okay. Anytime, I'd appreciate it. Thanks, Doug.

MR. MAHONE: Thank you.

MR. STANONIK: I'm Frank Stanonik with GAMA. As someone who is just learning about time dependent valuation, I just have a comment. I really don't understand how gas fired equipment gets dragged into this.

It looks to me as if you're trying to make the square peg fit the round hole. And, as an example, if you look at the first graph that Doug had showed you that showed the time variation in -- I assume that was electricity?

MR. MAHONE: Yeah, that was electricity.

MR. STANONIK: Right. And that makes sense that in the hot summer day, in the middle of the day, if you can do something to shed some of your cooling load that's the most valuable energy.

But, conversely, if you look at the graph for gas, which shows variation by season, if I need heat in the heating season, whenever that might and whatever part of California, I can't shed it; I can't say, well, I'm not going to heat

now, I'll wait for another hour or two, or I'll wait till the weather gets warmer.

I don't see how the concept that I understand in the electrical graph fits on a gas graph that is by season not by hour, and not even by day. It just seems to me you're trying to -- let me suggest, and again, I don't know a lot about this, but it seems to me in the interest of fuel equity you're trying to apply a concept that has a lot of applicability in one fuel, across the board.

MR. MAHONE: Shall I try to respond to that?

MR. LEBER: Sure.

MR. MAHONE: Okay. One of the fundamental concepts of this whole approach is to try to level the -- or rationalize and level the playing field between the fuels, so that they're all basically given a comparable valuation by time.

One of the reasons The Gas Company, for example, is interested in this is if you do a side-by-side comparison of gas cooling versus electric cooling, electric cooling is subject to these peak demand problems. Gas cooling isn't.

So in that kind of comparison for certain technologies, and it reflects reality, the gas cooling may have some benefits. And Title 24 has never been able to recognize those kinds of differences because everything was given a flat valuation.

Did you want to add something to that, Lance?

MR. DeLAURA: Actually I would just say that The Gas Company, we said this in the last workshop, as well, is still in an evaluation mode, as well. So we're trying to understand the concept more. And one of the reasons that we are funding this is to help with the gas side so that we can see what the impacts are; then make a decision either pro or con to support.

MR. MAHONE: Yeah, also Gary Fernstrom has something to add to this, as well.

MR. FERNSTROM: Let me just step in alongside. Gary Fernstrom, Pacific Gas and Electric Company. I think the gas appliance manufacturers and The Gas Company would agree that natural gas, pipeline gas, is less expensive in summer than it is in winter. That's one of their principle drivers for considering gas air

conditioning.

The purpose of time dependent valuation is simply to capture the time dependent variation in the cost of these energy products and their delivery.

Natural gas has a variation. It's more expensive in winter, as we all learned last winter when the price just about tripled, than it is in summer. And the purpose of this is simply to capture that factor.

It works exactly like electricity. And when you suggest that you can't put off heating, you can put off heating just as simply as you can put off air conditioning. You can use thermal heat storage. You can switch to some other source of fuel for heating. You can better insulate your home in winter. There are many measures you can do in your home to manage the use of gas just like you can the use of cooling.

MR. DeLAURA: Could I add something? This is Lance DeLaura again with Southern California Gas. I think one thing that's clear for all of us that are working on this project, and I do include Southern California Gas Company as a part of the team evaluating this process at

this point, is that we need to do a better job of communicating to the public what TDV is really about.

There were a number of questions that were raised in the previous workshop and I think we're hearing that again today. So it's just something that we need to, as this process evolves, continue to get updated information out to folks that make informed opinions and hence, decisions.

MR. LEBER: Did I see a third person in the audience who wanted to speak on this? If not, Steve Gates. There's more bodies up here, okay. Steve.

MR. GATES: Yes, Steve Gates with James Hirsch & Associates. I was a little unclear about the meaning of the 1992 adder. My impression was that if that adder wasn't there that the actual average cost of power that you come up with, or average cost of energy would be what, less than what was used in the '92 standards, is that right?

MR. MAHONE: Yeah, that's correct.

MR. GATES: Okay, so the intent of that is like some of these adders, for example the pollution adder, was to reflect some kind of

societal cost that is associated with energy consumption?

MR. MAHONE: That's correct.

MR. GATES: And the '92 adder, the justification for that is -- could you clarify that just a little bit?

MR. MAHONE: Yeah, we started with a basic assumption that it did not make sense to backtrack on the stringency of Title 24 standards. Everybody has pretty much come to terms with the standards as they are. The cost effectiveness of all the measures that the standards require were based on that valuation that was used in the '92 setting fundamentally.

And so we didn't want to backtrack on that. And so we made the assumption that we would benchmark the valuation to the valuation that was used in setting the '92 standards.

MR. GATES: Okay. One other quick question. Do you actually model the cost of energy varying with the ambient temperature outdoors? So, for example, if it's winter and it's a very cold day, do you recognize that gas is more expensive both because people are using more directly in furnaces, as well as power plants that

are having to fire heat pumps that are now running less efficiently, as well, is that right?

MR. MAHONE: Well, we don't go to that fine a granularity in our estimates, because the valuation that we assumed here is basically going to be applied for residential measures over a 30 year life of the building. And the little individual peaks and spikes are hard to capture in a 30-year forecast.

The one factor that we do have that is highly time dependent is on the electricity side, and that's the transmission and distribution factor which does correlate to high temperature conditions. And that component is developed as a function of the temperature extremes that occur in the 16 Energy Commission weather tapes.

But the kind of finer granularity to the, you know, price spikes and things like that we're not able to capture in a 30-year forecast like this.

MR. GATES: Thank you, Doug.

MR. LEBER: Gregg.

MR. ANDER: Thanks, Jon. Doug, just a couple quick questions here, sort of related. Is it your vision that there would be unique values

for all 8760 hours of a year, you know, sort of multipliers?

And in the event that you may add generation into the pool that may be super efficient combined cycle plants, say in the next year or two, or renewable contributions to the portfolio, how often would those values or multipliers be changed kind of in this process? Would it be annually, quarterly, every three -- part of a three-year cycle?

And lastly, if you have a building with generation capability built into it, how would that be handled?

MR. MAHONE: Okay, well, the first question is yes, we do have 8760 hourly values for electricity, natural gas and propane.

In terms of how often these values would be updated, the current values are based on the most recent generation forecast from the Department of Water Resources, which is a long-term forecast and includes their assumptions about what new power plants will be coming on line.

We would envision that the TDV values would probably only be changed with each code cycle, perhaps every three years. Because you

essentially change everything in the standards if you make a fundamental change to the valuation that underlies those standards.

So we're trying to pick a valuation scheme that has sort of a long-term perspective. And it's going to be basically sound over the long haul.

So it's not tremendously responsive to the current emergency conditions which are highly fluid and will probably be very different two years from now.

And then in terms of onsite generation, we hadn't actually thought about making any change to the current Commission rules for onsite generation which basically says that it's free energy.

So, to the extent that you would be offsetting baseline electricity or gas usage in the base building with essentially free energy that you're generating, I think you would get a credit that way. Maybe I'm not giving the best answer to that one. Gary, do you want to jump in?

MR. FERNSTROM: Gary Fernstrom, PG&E. I think we need to be careful with onsite generation with regard to whether it's renewable or not.

Renewables are, in a sense, free generation. Cogen or nonqualifying cogen simply on site of gas fueled power production isn't free. So I don't think the answer is clear as yet as to how that would be treated. But we need to make that careful differentiation between renewable and non.

MR. MAHONE: Yeah, thanks, my answer was really appropriate to renewables.

MR. FERNSTROM: And secondly, Gregg, with regard to your question about higher efficiency electric generation, since no fundamental change has been made in the basis of the standard for a long time, this change would capture at least the current state of affairs with more efficient generation in the state.

MR. LEBER: We need to move on to another question here. We had Mike Hodgson.

MR. HODGSON: Mike Hodgson with ConSol, representing CBIA. Doug, have you been able to predict or have a table of features that would be equivalent to today's standards, the '98 standards, today, '98-2001 standards, so that we would kind of get a grasp of what would be required under these and compare them to what the

existing standards are for housing?

MR. MAHONE: Well, our basic assumption is that the current packages and measures would probably be in place. We haven't revisited how those measures were constructed, or revisited how the components of those packages might be valued differently under TDV. I think that's an exercise that we would leave to others.

Our basic assumption would be that we would pretty much start with the current standards, and the TDV would probably be used for evaluating changes, and would be used for evaluating tradeoffs under the performance approach.

MR. HODGSON: So if you build to the existing standards you would meet the TDV standards based on TDV?

MR. LEBER: Well, I think there's a problem getting beyond -- I mean Doug has a proposal here that has been made, and specific proposal that was not funded by the Commission or by the Commission work.

But it's been very useful; I believe it was funded by PG&E. And the Commission needs to evaluate where all of these things land, and also

needs to evaluate just exactly how we land with TDV, at the TDV curves. And they may not exactly match what it is that we have from PG&E that Doug is presenting at this point. Probably going to be a lot of similarities.

And what the outcome will be has yet to be determined.

MR. HODGSON: Right, and I think the building industry, Jon, needs to do the same thing. And I understand that the tools are available so that you can do evaluation from your website. But I presume if you're going to, you know, make a proposal that we'd have an understanding of what impact that proposal would have, so that we could evaluate it.

And I was just wondering if any typical housing was run through that proposal so we would have a flavor that we're putting certain type of equipment in over existing insulation, or using certain types of windows instead of something else.

Sounds like that data is not yet available.

MR. MAHONE: That data is not yet available. The tools, we have prototype versions

of both residential and nonresidential compliance tools which are available to you or to anybody else who would like to play around with it and see how different measures might pan out if you were to do tradeoffs.

We are just, ourselves -- we did a round of explorations with an earlier version of TDV a year and a half ago which are in an earlier report that sort of give you a flavor for how this works out.

The current version of TDV has just been completed in the last week or so, and we are just now starting to do a set of parametric analyses for both residential and nonresidential measures.

So, by the time we next get together we hope to bring in some illustrations about how the various tradeoffs play out under a TDV scenario. But, you're invited to do the same if you'd like to take a look at some of the tradeoffs, yourself.

MR. HODGSON: Okay.

MR. MAHONE: We'll be happy to help you use those tools.

MR. LEBER: We need to move to the next question. Noah.

MR. HOROWITZ: Yes, Noah Horowitz with

NRDC. We're supportive of the concept in the abstract that I think I share the same views expressed by the prior speaker that we need to see some model runs or something that makes this more tangible.

And I think at some point we're going to have to -- if this proceeds further is what are the hours of operation for each different measure and what time of the day are they running.

So if you're talking about lights, are those on two hours or five hours a day; in the morning or the afternoon, because those will all have different values.

Secondly, if all this is based on the price of energy, basecase and then peak and giving credit to the differential, we could all try and spend a lot of time guessing what the price of power and what the differential peak is, we'll have 100 different answers.

But that's going to be key to this. And if prices are higher now than they're going to be in the future, with more demand and how the whole contracts play out, we might be building things on TDV assumptions that might change a couple years from now, but you'll have already built the house.

I'm a little concerned how all that plays out.

COMMISSIONER ROSENFELD: A question. This is Art Rosenfeld, CEC. As I understand it, Noah, and you -- Doug, tell me if I'm wrong, this doesn't envision price problems.

The value of electricity is simply calculated to be more expensive when the mix is different because you've got more peakers on line and they are less efficient and so on. It doesn't involve market power or any such historic actualities.

MR. HOROWITZ: My assumption it's the difference between base and the cost of the peaker.

COMMISSIONER ROSENFELD: Doug, am I right?

MR. MAHONE: Yeah. In developing this -- do you want to answer this one, Gary?

MR. FERNSTROM: No, go ahead.

MR. MAHONE: In developing this we've, of course, been doing it concurrently with some of the biggest panics in the markets for power that have ever occurred. And we have not tried to fold all that panic into this cost scenario.

We tried to develop a set of numbers

that are based on long-term, repeatable publicly available data, what over the long run energy should be valued at.

So, yeah, you can spend a whole lot of time talking about the current panics. And we've tried to avoid that.

MR. LEBER: We had two more people who wanted to comment, and we're like out of time here. I think Bill Mattinson wanted to --

MR. MATTINSON: In the interests of the schedule I'll pass on my comment.

MR. LEBER: And Ken.

MR. NITTLER: Yeah, wearing my hat that says software vendor, I will be working over the next number of weeks to implement the TDV model, so.

MR. FERNSTROM: I had a response to Noah's question. Gary Fernstrom, PG&E.

In terms of the commodity cost of the electricity product, itself, and the natural gas, we've used the CEC's 20 or 30 year forecast so there is quite some significant time stability to the figure that's being used.

With regard to transmission and distribution facilities, we've looked at that over

more than one investment cycle. So it's a perspective commensurate with the 30- to 50-year life of the buildings that we've used.

There is some peakiness in it, but it's not nearly as peaky as if we had just looked at the current circumstance with the electric market.

MR. HOROWITZ: Thank you.

MR. DeLAURA: Just one quick comment. This is Lance DeLaura with Southern California Gas. Even though we are sponsoring a piece of this TDV concept, we do share the same concerns that CBIA and NRDC have. And that is the devil is in the detail.

At this point we don't have a position. We need to do the runs, as well, and see what the outcomes are.

MR. LEBER: Thank you for you comments. Ready to move on to the envelope. And I believe Mr. Wilcox, the subcontractor, is the first presenter on that.

MR. WILCOX: Thank you, Jon. Could I have the first slide, please.

Okay, so we have a couple of topics that are in the big package here related to residential envelope.

The first has to do with potential changes to fenestration. And one of those is very simple. The first one that's shown on the slide here is the possibility of requiring a better U factor for windows if it's cost effective.

And that's a pretty straightforward analysis. Last time around I think in AB-970 we showed that the better U factor windows were probably cost effective and did not end up requiring them.

And so the question is whether we should move forward here and require better U factors, essentially a better frame performance.

The second point here is much more complicated and maybe important, and that is to change the treatment of window area in the standards.

Currently, if you do performance calculations the reference building that establishes the level of performance of the standard has a specified glass area, 16 percent in the northern zones and 20 percent at the floor area in the southern zones.

And if you put in more than that area of glass then you have to make up for it somewhere

else, because you're using more energy than the reference house. If you put in less, then that's treated as a conservation measure, and you get to save energy.

So, this proposal would take out that as a tradeoff; make the reference glass area the same as the proposed glass area.

And so essentially within some range, up to some upper limit, if you put in the prescriptive glass then you would come out meeting the standard.

The advantages to this are that it's easier to understand, and easier to, potentially if people do the prescriptive approach then it's easier to inspect and verify and so forth.

It also does not encourage people who have buildings with small glass areas to put in glazing that's clearly not cost effective, which the current standard does.

There's an issue of buildable packages to go along with that, and how those get constructed and so forth. A lot of details in which the devil will reside, of course.

Residential construction quality. The approach here is to use the research that the

Energy Commission has been carrying on, and that other people in the state and outside of the state have been carrying on about typical quality of construction, installation of insulation and how well that's done; the real framing factors for walls; the impact of fireplaces and other holes in the attic that promote infiltration.

What happens if you don't have a continuous ceiling air barrier. What happens if you got lots of recessed lights. And make an estimate of what the typical house really -- how well it really performs.

Essentially all of these things result in less performance than we currently allow for those things.

And then possibly provide a credit for people who do a better than typical job. And so with potentially verification. So it would be similar to what was done with the duct systems in the last round of this -- two rounds ago of the standards where there was a credit for doing tested ducts.

MR. LEBER: Thank you, Bruce. We have someone here for the insulation depth gauges? Is Mr. Hirsch in the audience?

MR. GATES: Yes, Steve Gates with Hirsch and Associates. -- my slide on this. It's in the category of what Bruce was just talking about in terms of insulation quality. And just to support that whole effort.

I personally have owned two houses where I forced the insulation contractor to come back in and reblow the attic because I was finding levels of insulation 50 percent or less in some cases, compared to what was required.

I've had friends with similar experiences. So, I don't think there's any point in spending a lot of time dwelling on this. Clearly, the whole issue of construction quality is critical. It's one thing to have a standard, it's another thing to enforce it.

MR. LEBER: Thank you, Steve. Do we have someone from SunWorks?

MR. STAHL: This is Ed Stahl. I'm a building contractor using structural insulated panels, and a member of SIPA, this presentation is on behalf of SIPA.

We would like to endorse structural insulated panels or SIPs, and put them into the Title 24 codes. Presently, we would like whole

wall R values to be better represented.

Can I have the next slide? At present I believe 9 percent framing factor is the amount that we can get. Obviously our walls right now perform much better than that.

The first slide up there is a whole wall from a house I built in Nevada City that shows that 6.42 percent of that is framing. The rest of that are structural insulated panels at the published R value, which would be anywhere from R-16 to R-24 for the wall.

We'd like to -- and we think that this should be credited or allowed for in Title 24.

The second aspect of this would be infiltration rates. The panels, themselves, are a systemized approach to putting a wall together. They're very very air tight.

Next slide, please. They're very very air tight, and we've had tests conducted by Florida Solar Energy Center, as well as Wisconsin, and various other studies, that show the average SIP home is about 1.8 air changes an hour at 50 Pa. We've had them as low as .55.

We feel this is typical and we know also that caulking and field installations can be a

problem. However, SIPs are cut and generated from CAD drawings to exact dimensions, and insure much better assembly that do not have leakage. This currently is not provided for in Title 24.

The photograph on the left actually is a stick frame with a SIP addition. During a snowstorm, a very light snowstorm in Nevada City, you can see the stick frame addition, the snow is melting. The SIP addition, there is absolutely no melting going on at this point in time. About 30 degrees F and snowing for about 30 minutes.

The addition is R-38, 2-by-12 construction, conventional framing. We see this time and time again.

We have a performance standard that is actually ongoing right now that will be finished by May 2002 to insure installation. We also have ongoing projects with the CEC that you're very welcome to monitor. And we are entering into contract with Oak Ridge Laboratories for infiltration studies. We would like to have these included. And we invite the CEC to partake in these and show us what you need so we can get this written into the code.

Thank you.

MR. LEBER: Thank you, Ed. Next one is Owens Corning. I presume that's you, Mr. Ware.

MR. WARE: That's me, Dave Ware, Owens Corning and representing NAIMA. I have three templates to present.

The first template here is basically to reevaluate the U factors and also the R factors for low rise residential occupancies. It ties into what Bruce Wilcox mentioned, and it also extends really that proposal to include all the other envelope values of tables 1 through 16, the basic package assumptions that are used for the standard design budget.

We know that the standards, as they are, at least, I believe the analysis that was in 1990, they are, indeed, cost effective. But 11 years has transpired since then, and certainly the energy crisis has escalated a lot. So we believe that it is indeed time, and there is sufficient lead time now, 2004, 2005 implementation date, for that activity to be undertaken.

Overall we believe that a reevaluation of the envelope measures will provide significant savings, both electrical and gas, and will improve thermal comfort of building. And it's also

consistent with the recent CPUC decision to encourage energy efficiency 30 percent higher than current Title 24 standards.

Next slide. The measures, per se, are all available and provide little effect on building's first cost. There's longevity of the savings over time. There's a couple of different ways that this can take.

We took a cut at, for instance, saying that one way to look at what we currently have is to require that when you have a 2-by-4 cavity or a 2-by-6 that you have to use the maximum amount of industry available insulation to fill the cavity. In other words, the 2-by-4 would be filled with R-15, and the 2-by-6 would be filled with R-21.

And you could, you know, arbitrarily say that you bump up the insulation level greater than it is now. And we took a look at that. And there's anywhere from 2 to 5 percent, or even greater in some climate zones, savings with taking that approach.

Other approaches might say that you start at the base EnergyStar level, which is slightly greater than current Title 24 standards, and take a look at that. And use that as the

base, setting the threshold for the energy level of a standard design budget.

So, the whole premise here is that the current standards and the envelope measures for the standard design budget are 11 years old. And we believe it's time that that whole set of cost effectiveness for measures be reevaluated.

My next template is revise the mandatory minimum ceiling insulation to R-34 all low rise residential occupancies.

This essentially would revise section 150-A for ceiling insulation and would change the R-19 to R-30. I have talked before about the kinds of tradeoffs that have occurred for the base building where the assumption is R-30, nothing lower than an R-30, and yet there's a lot of movement going down to an R-19 ceiling insulation.

And R-30 certainly will achieve greater savings than an R-19 actually in the field by making this change, revision to the mandatory measures. This discourages the kinds of tradeoffs that one can maintain in the compliance process. There's greater thermal comfort to the building.

We also took a look at what would be the impact of doing that, just making that unilateral

kind of change in the mandatory measures. And basically provides statewide savings of anywhere between 5 and 10 percent, and 2 to 6 percent -- cooling savings of 5 to 10 percent, and heating savings of 2 to 6 percent.

Next slide. This is a graphic representation of that study. In a typical climate zone where the R-19 -- or the R-30 basecase assumption is traded to the R-19 value. And this bar graph shows the savings that would accrue if indeed the R-30 was maintained.

Now, I have to tell you that the assumptions that we used was not the standard basecase building, but rather a 2200 square foot house with a water heating efficiency of .60, which is typically what's installed by nearly all builders.

So, if in the standards development process you use a base NAECA water heating efficiency, these savings would be even greater.

Next slide. Again, the R-30 is readily available; there's persistence of long-term savings. And I think it should be noted it's relatively inexpensive to install these measures initially as opposed to go back at a later date

and to retrofit responding to higher utility bills and things of that sort.

PG&E data indicates that 47 percent of the surveyed homes in their territory have approximately an R-20. And that's pretty significant. That shows there's a lot of tradeoffs going on in the marketplace, and under valuation of energy savings that consumers are getting.

And if you take a look at the Department of Finance data for single family homes and housing starts, we've estimated it at approximately 38,000 homes that have R-19 ceiling insulation. And we strongly feel that that is really substandard given today's energy crisis. And actually the price of differential between an R-19 and an R-30 is so small we're not getting good value to the consumer.

My next template is eliminate equipment efficiency tradeoffs to the building envelope. Just like in the previous slide of the bar graph where we assumed that .60 water heater efficiency, that's really what this is getting at.

The .60 is indeed the standard water heater that is used in construction, simply

because it's the only one available. And oftentimes some energy factor higher than .60 is the only one available.

So compliance is shown with that water heater, and immediately there is an energy credit that is provided. When, indeed, the water heating budget is fixed for the house when tradeoffs are given right to the house.

So the type of change that we are proposing is either to revise the mandatory building requirements to be equal to package D, or an alternative is to introduce requirements that prohibit or restrict envelope measures and equipment measures from being traded in the performance approach. So there would be restrictions in the ACM that would restrict that kind of thing.

You could revise section 151 B and C of the performance requirements so there are two separate energy budgets that must be met.

One for the water heating and one for space conditioning.

MR. LEBER: You need to wrap, Dave.

MR. WARE: Okay. Next slide. This is a graphical representation of just what the water

heating impact is on the budget. The left-hand graph shows the impact that the water heating budget has as a percent of the total space conditioning, but by all climate zones.

So, as you can see, in some climate zones, like climate zone -- well, 6, 7, 8, 9, it represents 60, 70, you know, over 70 percent of the total budget.

So anytime there's a credit on the water heating side you apply that to the compliance process, the space conditioning side, it's an overwhelming degradation of the envelope features for something that is not providing anything.

The graph on the right provides DHW savings as a percent of the total budget. And again, those savings are fairly significant.

The same occurs for space conditioning when you move a SEER 10 to a SEER 12, the savings are very similar. So my proposal is to restrict those kinds of tradeoffs in a number of different ways, in several different ways, or at least pick the most appropriate way. Because I don't believe the consumer, and ultimately it reflects the builder's performance, is really showing through what we currently have in the standards.

MR. LEBER: Are you done?

MR. WARE: Yes.

MR. LEBER: Thank you. The next party is Superior Radiant Insulation. We have someone representing Superior here?

MR. ZOLA: Good morning; my name is Len Zola and I represent a group of companies that are making this proposal regarding radiant barriers. And those companies are Alcoa, International Paper, Louisiana Pacific, Superior Radiant Insulation and Willamette Industries.

First of all I'd like to acknowledge that we are, you know, we definitely are pleased, and I might add grateful, that radiant barriers were included in the last AB-970 rounds. Specifically they were included in the prescriptive packages, particularly package D which is used to set the standard design for energy budgets.

But since then the reality of what that has meant actually in getting radiant barriers into the housing market has been very, say, lackluster. And I'm going to get into a few of those issues why. And why we're here proposing for a reevaluation and increased credit for

radiant barriers.

I'm going to be talking about key elements in the roof/attic/ceiling envelope, especially in the conditions that are present in that envelope at peak demand times, i.e., extremely hot summer conditions.

And I've got an overall theme because the two elements in that roof/attic/ceiling envelope are mass insulation, of course, and what we hope to be, is radiant barrier.

I'll have the first Vugraph, please. The theme is a word we're probably familiar with, symbiosis. And it illustrates the theme of living together. And our whole point is that mass insulation and radiant barriers at the peak demand times need to be together, working together as a team in order to create the most effective U value in that assembly.

So a little bit of background why we feel that the radiant barrier needs to be included as a key factor. Go to the second slide. Besides all the anecdotal evidence that our company over the last 30 years has gained and all the research done by Oak Ridge, Florida Solar, UNLV and a host of other ones, LBL and also our initial studies in

Roseville with Davis Energy Group, we were wondering why radiant barrier makes such a dramatic impact.

So, we went to a laboratory that's accredited and tested by the Department of Labor. It's an approved lab. We used a hot box test, a C-236 test. We made a few minor -- well, if you're an ASTM official you might not consider them minor, but we did some changes to simulate summer conditions.

What we did, in fact, was using the rotatable hot box, we put the hot side up. We used a one-inch air space above the mass insulation. In this case it was an R-30 glass fiber batt; the low density's three-quarters of a pound per cubic foot. And then we increased the delta T between hot to cold side up to the delta Ts that would be in a very very representative attic during summertime.

And you see on the Vugraph that was the delta T we went, was the bottom, was 61.7 degrees. The mean was 85, which is a little bit higher than what's normal. And the R value that resulted in the 236 test was, unfortunately, a degradation down to 15.2.

Now, this is not a slam on mass insulation. In fact, I was, for the last 26.5 years involved with a very very large insulation subcontractor.

MR. LEBER: Len, you're at the end of your time, so --

MR. ZOLA: Can I just take 30 more seconds? Basically we're asking for two things. We're asking for a mandatory feature. I know that's the holy grail, but here's the key. With that symbiosis we have a situation we know. I don't know if we require a paradigm shift in the Commission or not, but we're dealing with keeping those two elements together so they can't be traded off against.

The other thing would be an increase in that prescriptive package that we have, so that it becomes more attractive to Title 24 consultants and their clients, the builders.

We just feel this is so important to what's happening right now with California being the sixth largest economy in the world, and enduring the embarrassment of developing world blackouts. We think this is something we should be definitely dealing with, and we hope the

Commission takes it upon themselves to help us.

Thank you.

MR. LEBER: Okay, thank you, Len. The next person is Cardinal Glass.

MR. MATTINSON: Eric DeVito couldn't be here and he has asked me to make his presentation, so if you'd get the slides for Cardinal. And I really hope to gain some time on the schedule with this. We have 17 minutes; I think I'll take less than that.

Cardinal made a number of template submittals for the residential standards changes, nd the first one's here on the building envelope beginning with adopting a .4 solar heat gain coefficient as a mandatory measure for all fenestration. That is probably their highest priority goal. That's something that they pursued in the AB-970 proceedings, and continue to think is extremely important.

A couple of other issues, I'll get to them as we go. Let's go to the next slide.

Specifically to the .40 SHGC their proposal is to mandate .4 SHGC as a maximum for all fenestration products, new constructions, additions, alterations and replacements.

Although it would be simpler and perhaps easier to understand if .40 were mandated in all climate zones, there are some compelling arguments for excluding several heating dominated climate zones. And Cardinal would be amenable to just applying the .40 mandatory SHGC to the climate zones that now have .40 as part of the prescriptive standard package.

There could also be exemptions for passive solar homes where one can be shown to be making a comprehensive attempt to optimize winter heat gain for passive solar purposes.

And there are some other issues that could be raised that aren't brought forth here that we believe could be handled by exemptions. Things like historic buildings with traditional windows that could perhaps not accept NFRC tested products. Those, I think, Cardinal believes could all be handled by exceptions.

And then finally, Cardinal suggests that this mandatory measure would be a weighted average approach so that it would still allow a small amount of decorative glass or special glazing, as long as the weighted average of all the new fenestration products installed met the .40 solar

heat gain.

The gain, the benefit of that is to insure that electrical peak demands are reduced.

As it is now, although it's in the standard packages in many climate zones, some cases low fenestration, solar heat gain glass is not being installed significantly in homes with smaller glass area than the prescriptive packages allow, but in other cases traded off against other measures.

So it extends the benefits of reduced solar heat gain to all homes.

And Cardinal believes this would reduce compliance costs because as this became the standard glass throughout the State of California, the cost would go down. And it has already, over time, with the adoption of it in the prescriptive measures it would go down further, it's believed.

Since the standards already establish other mandatory measures, air leakage for fenestration, mandatory labeling for fenestration, minimum ceiling/wall/floor insulation R values, Cardinal believes this is in keeping with directions that the Commission has already taken.

So that's a key element in something that

Cardinal believes is very important.

A couple of other issues, let's go to the next slide. Alternative compliance packages. Cardinal, of course, sells product throughout the entire country, and many other parts of the country depend on prescriptive packages much more than California does.

But they believe that packages should be playing an important role here, too. And to do that they're suggesting that new compliance packages be developed with larger allowed glazing percentages. This is separate from the measure that Bruce introduced on the Commission's template. Cardinal's proposing that the Commission develop some glazing prescriptive packages, perhaps up to 25 percent maximum.

Cardinal is suggesting that these should maintain energy neutrality, not glazing area neutrality, but energy neutrality so that if there were a package with 25 percent glass, then additional conservation measures should be applied to that package so that the 25 percent glass hour uses no more energy than the current package D house. That would be offset with either lower SHGC, lower U factor in the fenestration products,

or improvements in other areas in the building.

Next slide. New alternative compliance packages for additions. Cardinal is suggesting that the compliance approach for additions and alterations be modified or be revisited. We'll talk about some specifics to the alterations later on the agenda.

But to talk briefly, alterations right now allow unlimited glass area. If it's your house or my house that's sitting there, you can add all the windows you want, 100 percent glass if you can handle that structurally and from a privacy standpoint or whatever else comes in.

And yet as soon as we start adding an addition there is severe glass restrictions. Cardinal would like to see some compliance packages for small additions up to 500 square feet that allow more glass area than the current new construction packages, which are what constrain addition packages now

And their thoughts are that it's often in conjunction with an alteration. And rather than allow only say 16 to 20 percent glass in the addition, and unlimited in the alteration, that there be a change to the addition method.

And then finally Cardinal suggests that, as Dave Ware said, Owens Corning and NAIMA believe that it's time to revisit the cost effective measures in the prescriptive values, whether they're for fenestration, insulation, wall, ceilings or whatever.

So, that is probably a timely issue. And I believe staff was already suggesting that lower U factor are being considered in their proposal, too, for fenestration products. So, again, Cardinal joins in supporting that.

That's really all the new construction issues. I do have two more later in the agenda.

Oh, and thank you for letting me wear my new hat today, as a Cardinal spokesman. I will also remain here representing CABEC. But since the Cardinal folks could not make it, I agreed to fill in for them.

MR. LEBER: Thank you, Bill. So that moves us to questions. Do we have questions here? Two, only two? Three, four, five, six, suddenly it's spread. It's some sort of a disease or virus.

All right, why don't we start with the gentleman in the rear. Is that Ray?

MR. BJERRUM: Ray Bjerrum representing Western Region AAMA. I think Bill did a great job doing the presentation for Cardinal. I have to say that the window industry would have to evaluate, and really the question is of Bruce Wilcox, how we're going to try to evaluate. The same thing that came under time dependent, how are we going to evaluate a new compliance that has to do with windows, as opposed to being able to look at the MICROPAS program, which you're proposing is a new relationship, from what I understand.

MR. WILCOX: Is this a question about removing the glazing area tradeoff?

MR. BJERRUM: Yes.

MR. WILCOX: Yeah, well, I think that what we've done in the past is, and what I think we would intend to do here, would be to make a development version of MICROPAS that we would use for our analysis and be made available to people who wanted to look at it. I assume that Ken's willing to do that.

MR. BJERRUM: So it will all be in MICROPAS, however we're going to look at this tradeoff?

MR. WILCOX: Well, that whole tradeoff

issue is really a MICROPAS issue. It's really a performance calculation issue. It's not an issue with packages, really, so --

MR. BJERRUM: Oh, I thought you'd said there was a prescriptive package that would have a --

MR. WILCOX: Well, yeah, if we --

MR. BJERRUM: The ability to tradeoff other than 16 percent. You'd be able to go one way or another with glazing.

MR. WILCOX: Right. Currently you can build a package if you have 12 percent glass, and that's fine. And what we would do is presumably you could build a package if you had more than 16 percent glass, but we have to work out the details of what the limits would be.

MR. ELEY: Could I address this, as well? In '92 we went to a similar system for nonresidential buildings. And I think, in my opinion, it's worked quite well.

ASHRAE has a similar system for standard 90.1. Now, granted there's a wider variation of glass area in nonresidential buildings than with residences. But still the variation is quite large with residences. Especially when you

include all of the residences that are regulated by these standards, multifamily.

If you look at the data on fenestration areas there's examples in the RER database of buildings with 35, 40 percent window area as a ratio of the floor. There's also some data in there with 11 percent, since family homes.

MR. BJERRUM: Well, our industry supports increased glazing area.

(Laughter.)

MR. ELEY: But on the other hand, if you happen to have a building that has small glazing area, in particular a multifamily building that maybe has just windows on one side or something, right now you can make all sorts of tradeoffs against that reduced glazing area, which is probably not the right thing to do.

So by having this proposal I think we solve one of the biggest problems with multifamily, in addition to maybe having a package that's more buildable.

I think what happened in nonres is after we made the shift, I think the data will support me, there's a lot less use of the performance method because one of the things that keeps

driving people to the performance method is the need to have the windows that they feel are important.

And I think a similar thing would happen here. We would have a simpler system, one that would be more enforceable hopefully.

MR. BJERRUM: I think that the industry would support a simpler system. At this point, in the package, if it's done in MICROPAS it's very strict. And if you add a U value or a solar heat gain number and you could just trade if off against the wall a simple way, as somebody wanted to change a room after it had been calculated, I think our industry would support a simpler way.

MR. LEBER: We need to move on to other commenters here. There was someone in the back here.

MR. DAY: I'm Michael Day with Beutler Industries. Two things that we want to make a comment on today. First off, with regards to the elimination of tradeoffs between equipment and the envelope, we think that the tradeoffs between different measures within the envelope has been one of the key reasons that Title 24 has worked so well.

Basically it's allowed competition. It hasn't stifled competition by legislative or regulatory fiat, especially things on the equipment side that we don't even know about that might be in development, that could really have greater time dependent valuation. And we would strongly oppose anything having to do with the elimination or reduction of tradeoffs between measures within the envelope.

Second of all, with regards to duct insulation, two things that we think might have some value would include the consideration of the effect upon duct R value of partial submergence of the duct work within the insulation.

And also some of the stuff that's coming out of ASHRAE now of the really great effects of radiant barrier upon the outside of the duct work, and the effect of that upon the R values, as well.

Thank you.

MR. LEBER: Thank you, Michael.

MR. WILCOX: Can I ask, Michael, can you give us a reference for that radiant barriers on the ducts?

MR. DAY: I don't have it with me, but I could --

MR. WILCOX: If you could send one, please?

MR. DAY: -- submit it to Bryan.

MR. WILCOX: Okay, thank you.

MR. LEBER: I think that was everybody in the audience away from the table? No, now we have another.

MR. AKERS: Ron Akers, Advanced Foil Systems. I seem to have been ousted out of the agenda somehow, but I just wanted to touch on radiant barriers again, a little bit more really quick. And the fact that how well they enhance insulation levels as they stand, or where they may go.

The two definitely seem to work together quite well and I think they will be able to handle the beating the problem of peak load demands.

I don't necessarily -- we have a problem with the tradeoff scenario. I believe you really need to deal with an attic envelope, as it stands, rather than consideration of maybe alterations within a wall assembly.

The attic envelope subjected to intense radiant heat needs to be handled as that. The duct issue is a very big factor of taking infrared

off the cooling ducts.

And like to see, even if possible, as Len with Superior said, it may be the holy grail, but absent the fact that even those homes that are built with ducts in cooling climates be considered that a radiant barrier goes in there as a mandatory measure.

And anybody that has any questions or comments to me, I'd more than welcome. Thank you.

MR. LEBER: Thank you. So to the table, who did we have on this side first?

MR. WILCOX: I wanted to follow up on the presentation on the radiant barriers. And he didn't really get to present his whole approach, but I understood him to be asking for more credit for radiant barriers.

And I quickly looked at his template. It's not clear to me what the basis for the more credit would be. And I think we need to have more information about where that would come from.

And are we proposing to start rating ceiling insulation using the test that he proposed, all the ceiling insulation ought to be done that way?

It's not quite clear to me exactly what

they're really proposing.

MR. ZOLA: May I make a comment? We are going to be doing, as a loose knit coalition, additional testing on that, Charles. What we're going to be emphasizing, just like it seems like the majority of the templates are, the specific conditions at peak load. And that boils down to an intense infrared load, and the high delta Ts.

And, you know, the issue of mass insulation was only brought up because it's a highly important, integral part of that envelope. And unfortunately it has a few liabilities.

And one of those liabilities is that the peak load all of the assumptions are made that the U value for mass insulation at peak load conditions are the labeled R values. They are not. And we, you know, we will produce additional information to that.

TDV will also address, you know, some increases in credit for radiant barrier.

Again, just to hit on that theme, these two elements, mass insulation and radiant barrier, must stay together as a team. And that's our very strong proposal.

MR. LEBER: We've got a whole series of

people here, so I was going to kind of go clockwise around the table here. And so --

(Laughter.)

MR. LEBER: I can't even go clockwise when counter-clockwise keeps popping up after I move. So, okay, Ken, did you have something?

MR. NITTLER: Yeah, just some brief comments on the fenestration area. Not wearing a hat as a contractor on this.

I have some real significant concerns about changing how we treat glazing area and the performance approach. One issue is that it's going to tremendously complicate how you do standards analysis.

Every house gets a different answer every time there's a change in glass area. So establishing where the standard is is going to become a more difficult task.

I'm also a little worried about unintended side effects if this isn't handled properly. Certainly one of the efforts is to keep peak energy use under control here. And if the net result of this is increased glass area, without some sort of energy neutrality and peak demand neutrality involved, you could accidentally

end up with homes that have higher peak demands.

There's probably no factor, no single envelope factor bigger than the area, the performance and the orientation of the windows. If people doing compliance work, people that run the software, there's probably no one factor you change in the building that changes the results more.

And creating a standard that hides that fundamental physical fact doesn't make sense to me.

Thank you.

MR. LEBER: Doug.

MR. MAHONE: I just wanted to comment on Dave Ware's proposal that we eliminate tradeoffs between sort of permanent kinds of insulation or glazing measures versus the equipment and the supposedly less permanent stuff.

Eliminating those kinds of tradeoffs would be a fundamental change to the basic ground rules that we've had in Title 24 for a long time. And I think it needs to be approached very carefully.

At the same time I would point out that the TDV team has grappled with this, as well,

because one of the characteristics of TDV is that some kinds of measures that simply control the time when equipment operates would end up looking pretty good under a TDV scenario, but they may be less persistent than say wall insulation would be.

It's a potentially confounding, or at least very complicated aspect of the standards.

One approach that we came up with but have not developed into a full bore proposal would be that for measures where the Commission felt they had lower or less persistence over time that there would be some kind of a discount factor or degradation factor applied to those kinds of measures. And other more persistent measures would not have that kind of degradation factor.

But I think Dave raises really one of the root philosophical questions in the standards that needs a pretty careful and thorough evaluation.

MR. LEBER: Thank you, Doug. Nehemiah.

MR. STONE: I've actually got a couple comments and a question. First off, on Bruce's -- actually, I'm sorry, it was Charles' proposal for how to deal with the problem of window area going to window/wall ratio, actually for multifamily,

which we'll get to later, that is one of the proposals we're making, so that we don't have this problem of one wall having fenestration instead of four walls, skewing the budget and allowing everything else that's valuable for energy efficiency to be traded away.

Mostly I want to respond to Cardinal's suggestions. Mandatory SHGC virtually in every case in all buildings, whether it's new additions, remodel or replacement windows.

One of the things that's happened in the code over time is moving away from a rational solar design approach to let's just pretend everybody does the most stupid thing and make the same requirement everywhere. And I think that that's inappropriate.

And in this case the number of exceptions that would have to be included for a mandatory SHGC level is overwhelming. And this would not simplify the standards.

One good example is that, you know, if you have one-foot eaves versus having two-and-a-half-foot eaves, you're not going to get anywhere near the same benefit from SHGC. As a matter of fact, you are eliminating the possible benefits

you could have from having a good design of two-and-a-half-foot eaves, having the winter gains that you want and excluding the summer gains, if you go to a mandatory SHGC.

And Bill, you also made the point that, you know, the standards have included all sorts of mandatory measures with windows and with other things including infiltration, U factor levels for insulation, et cetera, SHGC is fundamentally different from any of those. All of those other things that were mentioned, and virtually everything that's in the standards that has a mandatory measure level, bigger is better. Or moving one direction is better. SHGC is not uni-directionally better.

There's a problem, in fact, with having default levels for it for that very reason. But you can't say, well, you move to this and in all cases you're getting better. In many cases you will not. And so it simply should not be a mandatory measure, but you know, if we need to move prescriptive levels to send the right signals that might be appropriate.

Thanks.

MR. LEBER: Okay. Who was the next

person who wanted to comment here? Dave.

MR. WARE: Dave Ware, Owens Corning and representing NAIMA. A couple questions for Bruce. In regards to this somewhat unlimited glazing suggestion, are you indeed suggesting --

(Parties speaking simultaneously.)

MR. WARE: Well, that's what I'm getting at. Were you suggesting the possibility of looking -- and there's been a lot of comments around that, beating at the bush. But I'll say it direct first. Are you suggesting that, or implying that there could be a development of a package based upon unlimited glazing?

And the reason why I say that is because a package like that could indeed be viewed by builders as, notwithstanding issues from the glazing industry of how the impact of that, could be viewed by the builders as a much easier package to implement in the field, and design to?

In other words, you take out the glazing portion and restriction out of the package and no longer do you have to deal with that issue from a building perspective and buying your products and things of that sort. But the enforcement officials don't have to deal with that very

complicated element out in the field.

Oregon has that concept. They've had it for ten years now. Their package 1, 90 percent of all builders build package 1 in Oregon. The State of Washington has just, and they will adopt here shortly, made the changes to their standards that basically will have unlimited glazing. And they expect, from all the public comment they have, that builders will move from a performance based compliance to that package.

Now, of course, there's all kinds of assumptions that went into that, the development of those, both in Oregon and in Washington. But it seems to have been very successful in the State of Oregon and it looks like it may, indeed, be successful in the State of Washington.

So I was just trying to tag onto some of the comments that were made to that.

One more question and then you can answer. Or, maybe --

MR. WILCOX: I was going to ask you if that was a question, Dave.

MR. WARE: That was a question, but --

(Laughter.)

MR. WARE: Sorry about that.

MR. WILCOX: Well, I think the concept is certainly proposed in knowledge of what's going on in Oregon, for example. And I think that it does offer a potential for a simpler compliance system.

There's certainly no, you know, there's very little enforcement of window area in the field, that's clear. That's way too hard to do. It's even too hard to figure out what the window area is in the field.

So, if you do away with that as variable then I think it simplifies the whole process for the builders and the compliance people.

The question is whether or not you lose in terms of peak or energy in a big way. And I guess the data that I've seen that compares window area in Washington State to Oregon would lead one to believe that it doesn't seem to matter whether the window area is limited or not. They both end up with the same glass area. But how good that data is is not quite clear. But that's something we're going to have to debate.

MR. LEBER: We really need to move on to other commenters here, but it was pointed out to me that we may very well not be talking about

totally unlimited, that there just be a higher cap than what there currently is.

The next person was Bill.

MR. MATTINSON: Yeah, Bill Mattinson representing CABEC. Doug Beeman, the Chairman of CABEC, submitted a letter to the staff and there were copies of that on the table, specifically treating the fenestration proposal that is in the template from the Commission contractors.

CABEC is very much opposed to increasing in glass area, whether it's in prescriptive or performance. Here's the three points that Doug made, and then I have a couple of my own, just for you.

He says to justify an increase in the proposed design glazing percentage based on the average percentage of glazing in existing homes statewide is irrelevant.

Balancing reduced efficiency in some homes with an increase in other homes seems inherently unfair to both builders and home buyers.

Secondly, since the current standards have been shown to be cost effective, it seems unnecessary to relax the energy standards below

their current threshold.

And third, after the significant increase in efficiency with the AB-970 standards, it seems a giant step backwards to increase the proposed design glazing area by 4 percent.

A new house that has 24 percent glass with no other changes is going to use more energy than a house that has 20 percent under the current standards. And there's no two ways about that.

You know, when Bruce talked about it being easier to enforce if you don't have glazing percentages, the CHP would have a far easier time enforcing highway if we didn't have a speed limit, either. But I don't think that's the right thing to do.

(Laughter.)

MR. MATTINSON: And I don't think that's the right thing to do here, because as Ken so aptly stated, windows are the biggest contributor to energy consumption in homes, particularly at peak periods. Ratcheting that up is inherently a step back from all the gains we've achieved so far.

Now a few of my own personal comments. One thing in the template is very vague or unclear

to me is what's being proposed. The first sentence says, create package alternatives with higher fenestration percentages. May be offset by increasing the performance of fenestration products, or making other features more efficient. Some statement about special treatment for west-facing glass.

And then it says, for performance calculations make the glazing area of the reference house and performance calculations the same as the proposed house, that ratcheting, but with no offsetting tradeoffs.

So, now if I believe this, we've got possibly package measures that allow increased glass but require restrictions on the addition of other conservation measures to neutralize the energy use. And performance methods that don't. And so we've just divorced our system where the performance budget has been based on the prescriptive package budget.

So, this is very unclear to me. And I know everybody's template here is unclear, and we weren't expected to have, you know, the ultimate in detail. And I just need some clarification on that because it's a divergence that I hadn't

expected.

MR. ELEY: Could we get clarification of CABEC's position -- I mean there's kind of two parts to this glazing proposal. One of them is to -- I don't think anybody's talked about eliminating the limit.

MR. MATTINSON: Raising the limit.

MR. ELEY: Well, maybe, maybe not. The other part of it is to, let's say you're in a climate and the limit's 20 percent. But your budget building has either 20 percent, or it's less than 20 percent, it has what, the glass that's proposed. Does CABEC oppose that part of it?

MR. MATTINSON: No.

MR. ELEY: Okay, all right.

MR. MATTINSON: And I was about to get to that in my own points that Doug didn't speak to.

MR. ELEY: Okay.

MR. MATTINSON: But, I believe that setting the proposed glazing equal to the standard is perhaps appropriate when you're --

MR. ELEY: So the issue --

MR. MATTINSON: -- beneath the limit.

MR. ELEY: -- with you is the upper limit?

MR. MATTINSON: The issue is let's capture the energy that's being left on the table by the guy with 12 percent glass that goes with dual pane worst windows he can buy by making the proposed equal to the standard there.

But let's not let the speed limit drivers, the ones that are up at the top, the production builders especially, who are in competitive markets where glazing is part of the sex appeal and the sales appeal of their house, let's not let them run free at 90 miles an hour without making offsetting tradeoffs.

If we need to address this in multifamily by changing it to a ratio of glazing to wall, rather than floor, or by setting lower limits than the 16 or 20 percent, fine, so be it. There are so many inequities or anomalies between the way you handle multifamily and single family anyway, when it comes to water heating and exterior walls and all these things, but I think we can fix those on their own without introducing new changes on the single family dwelling side.

As Ken said, this sends the wrong

message to builders by having the glazing percentage move and the energy budget move. It's very difficult to determine what's cost effective and energy conserving approach to take when you're designing a home.

I believe, CABEC believes, and I think other people believe that we should not degrade the efficiency and the savings that we have achieved over the last cycle. And that we should, if we're going to increase prescriptive glass areas, we should do what we have to do under performance now, which is offset it with other measures.

One final thing that hasn't been discussed here that I know of is there's a big difference between the performance approach and the prescriptive approach And if you make the prescriptive approach more widely acceptable by increasing the glass area, for example, without any offsetting measures, you are allowing people to build far worse houses than they would have built under the current performance approach.

Because under the performance compliance approach the glass is analyzed at its actual proposed orientation. And although the package

may allow 20 percent glass, if you had all 20 percent of that, hypothetically speaking, on the west side you would not achieve compliance.

But under a package you could do that. And you could get many more worse houses that would not ever comply under performance by allowing this larger limit under a prescriptive package area.

So, in that respect I think the current performance method that requires that we look at the real house, as Nehemiah's suggesting, we look at the real house, the real glazing orientation, the ones that are beneficial in a climate zone, the overhangs, all those things that come into play as part of a complete analysis, we get better houses than we would with increased glass in packages.

Thanks.

MR. LEBER: Okay.

MR. RAYMER: Bob Raymer, Technical Director with the California Building Industry Association. A couple of clarification points.

We're not asking for unlimited. We're looking for marketable packages. If there's some way that we can have glass calculated on both

sides of the equation, up to a certain limit, that's what we're looking for.

We're seeking simplicity in compliance documentation, in design, in building and in enforcement. That's what we're trying to accomplish here. And I've got to believe we can do that. At no time have we ever advocated just going 90 miles an hour.

On the other case, in terms of multifamily construction I'd like to segregate out condominiums from apartments, particularly low and moderate income geared apartments.

The affordability issue for low and moderate income apartments is going to become increasingly more important over the next few years. Just get a copy of The Sacramento Bee today and read the article that appears on page one of the front page section and on page one of the metro section. You'll see that low and moderate income apartments are taking a big hit, and the state's going to be facing a severe problem.

As long as we go ahead and keep that in mind and we look at the first-cost impact of whatever the revised standards are going to be, we

can face that problem. But once again, in no case are we suggesting anywhere that we simply open up the flood gates. We never have.

MR. LEBER: Noah.

MR. HOROWITZ: My point -- Noah Horowitz, NRDC. Mine's more of a clarifying nature than comment. If I understand things right you're going to eliminate the tradeoff for lower glazing area, which we support.

And then I hear people interpreting things a different way and I hope we can get to the root of this. When we're talking about prescriptive packages, if you increase the glazing area will there be some requirement of offsetting measures. Some people are assuming you're not requiring that.

MR. WILCOX: Well, I think that's open at this point. I mean there's been some discussion about the desirability of having packages that would allow more glass. There's been some discussion of whether tradeoffs should be required or not.

And then there's this concept of having, taking the glass area tradeoff out of the equation for some group of buildings. And it's not clear

how those all relate to each other at this point. I mean it's open it seems to me.

MR. HOROWITZ: Okay. I guess my comment then, based on that, is if we are going to allow increased glazing in packages which we're open to, we need to make sure they're offsetting measures. No surprise.

MR. LEBER: Mazi.

MR. SHIRAKH: Actually it was a question for the radiant barrier gentleman earlier. I was wondering what is the cost of putting radiant barrier, initial cost for say a 2000 square foot, single story?

MR. ZOLA: Right, in our template we have identified the most cost effective type of radiant barrier, would be right about 12 cents a square foot to the builder.

If you look at the fact that just roughly 50 percent of the new home starts are two stories, we're just taking an average square foot of 1200 there. Say 2400 for one story, average that out and you're talking about a total cost to the builder probably around $225.

And just one other point. If you look at just a base of 100,000 new starts in a year,

let's say half of those use radiant barrier. Multiply, do the math, you end up with about a cost of $12- to $13 million. That amount, I know when I was working for a very large insulation subcontractor, right now just one insulation subcontractor in the five-county area of Los Angeles, surrounding Los Angeles, does that in a year. One subcontractor.

So, again, we're talking about a huge benefit for an incredibly small dollar amount. And again, bottomline, I can guarantee you there's not going to be any Bill Gates coming out of the radiant barrier industry.

MR. LEBER: Other comments? Anyone else? Jon.

MR. McHUGH: I'll be brief. Joh McHugh, HMG. Bruce had mentioned that his proposal was quite similar to ASHRAE 90.1. I'd like to point out that actually ASHRAE 90.1, when you look at window/wall ratios, what happens is that in their version of the performance method for areas that are smaller than the prescriptive amount, you do exactly what Bruce is saying, you have the same area.

When you get above -- and in that case

it's 40 percent -- when you get above 40 percent, let's say you have 50 percent, the basecase you would model as having 40 percent, and then the proposed case would be modeled at having the 50 percent windows.

So that's slightly different than I think what Bruce had presented in terms of that it might be unlimited.

MR. LEBER: Dave.

MR. WARE: On this glazing issue, I just want to clarify. I wasn't suggesting that envelope measures should remained fixed to compensate for -- glazing. They should be increased commensurate to maintain the same threshold. That's what Oregon has done, and that's what the State of Washington has done.

And just also for a point of reference on that, the DOE actually had intended to submit a code change for the IECC to make unlimited glazing the base for this go-round, actually code changes go in today. They have just elected to hold that code change off, and wait for the next cycle.

So, there is some movement, not only in other states, my point here, to try to find a way that can improve the enforcement side of energy

compliance.

And the three examples that I just gave, the two states and the IECC, is they are looking at glazing as being one of the hardest area for enforcement officials to deal with. I'm not suggesting anything, I'm just providing some information on the subject.

MR. LEBER: Okay.

SPEAKER: Oregon and Washington, to my knowledge, do not address cooling. So when you look at the context of unlimited glazing or high glazing percentages, let's keep that fact in mind.

MR. MATTINSON: And, if as Dave says, that proposal for the IECC to allow limited glazing has been retracted, then I would take it not as an argument that we should do it, but that we should think a whole lot more before we do it.

MR. PENNINGTON: This is Bill Pennington, sorry to join you so late here today. Dave, I didn't understand what you said about Oregon's code. You said that as the glazing area goes up requirements for other features go up. So is there some constant energy that they're trying to maintain?

MR. WARE: That's correct. Both Oregon

and Washington's code is not all that different than ours, I mean there are some differences, but there is a threshold of minimum energy that is to be maintained, and their path one, restrictive package one, if you will, has unlimited glazing.

They have seven packages, or seven paths. Path one, the unlimited glazing, is the compliance choice that 90 percent of all builders use in the State of Oregon.

MR. PENNINGTON: So to have equal energy, then, for unlimited glazing they'd have to have unlimited insulation requirements, as well?

(Parties speaking simultaneously.)

MR. WARE: That package includes R-21 walls, R-48 ceilings --

MR. PENNINGTON: So they've raised the insulation requirements considerably there?

MR. WARE: Yeah, they've raised the insulation levels, very good glazing and equipment efficiencies, things like that. The same approach that the IECC is considering in their potential code change.

MR. LEBER: Sure, John, go ahead.

MR. PROCTOR: John Proctor, Proctor Engineering Group. I guess I'm missing something

here. How does it make compliance checking any easier, if before you couldn't figure out whether it was 20 percent of the floor area, how are you going to figure out whether they built it to 40 percent, when they only said they were going to build 35 percent?

How's the compliance issue get better? I don't get it.

MR. WILCOX: Well, if for most houses you don't have to deal with the area of the glass as an issue, then it's not an issue, it's simpler. For the houses that have come up against some limit and it becomes an issue, then it's no different than it is now.

MR. MATTINSON: Well, Bruce, I thought you said you weren't arguing for unlimited glass? And right now you said if you don't have a limit you don't have a compliance problem. But if you're arguing for a limit that just happens to be a little higher than where it is now, I think John's point is --

MR. WILCOX: Yeah, well, the --

MR. MATTINSON: -- terrific. How do you know if it's 23 or 25?

MR. LEBER: I'm not sure this

conversation is starting to just -- I hear contention starting, and I'm not sure that that gives us any additional information that helps here.

(Laughter.)

MR. MATTINSON: Friendly contention.

MR. LEBER: We had a gentleman, Hasheem Akbari, is he in the room?

MR. AKBARI: Yes, I am.

MR. LEBER: Who I believe had a question. He had to go off to something else and just returned, I believe, and had a question on this issue.

MR. AKBARI: I wanted to make this comment that there is an effort right now going on in the commercial sector to include the impact of the reflective rules, or the effect of the reflective rules for the lowest -- and there is, within the last year there have been enough of developing industry that we are ready to recommend that the same thing to be done for slope roofs.

However, the bar for the slope roofs probably be set at the lower level. And particularly the graph that I have in here is showing the reflectivity of the materials or the

higher solar spectrum. And there are some novel materials that are highly reflective in the near infrared portion of the solar energy. And that's the part that the eye is not sensitive to, but the surface would absorb it as a heat.

As an example, if you look at the reflectivity spectrum of a novel cool-black, which is that dark black at the middle of the curve, versus the one that is a standard carbon black, which is at the lower part of the set of curves, is right just above the axis, you would find out that a novel cool-black has a reflectivity of about 30 to 35 percent, even though it looks absolutely black and there is no way to distinguish it from the standard black. And the standard black has a reflectivity of about 4 percent.

So, the reason that I'm showing this thing is that a lot of manufacturers have noted that if they use this novel black and other novel pigments in their pigmentation of their materials there is a quick way of making cool roofs available. And there are already few products of such in the market.

So I would strongly like to see that the

Title 24 for the next generation would have the cool roof in the residential sectors, as well.

MR. LEBER: Okay, thank you. Theoretically we have another six minutes that we could beat ourselves up on this issue.

(Laughter.)

MR. LEBER: But if no one's a real strong advocate for that, we would leave for lunch right now. And come back maybe five minutes early at five minutes to one instead of the 1:00, and then we could get out of here a little bit earlier at the end of the day.

So, we will see you here at five minutes to one.

(Whereupon, at 12:04 p.m., the workshop was adjourned, to reconvene at 12:55 p.m., this same day.)

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AFTERNOON SESSION

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MR. LEBER: All right, we'll continue with our workshop. I have to find my glasses so I can see the page I'm trying to read.

All right, the subject this afternoon is HVAC. And Bruce Wilcox has a short presentation on that.

MR. WILCOX: A short presentation?

MR. LEBER: Well, everything is short.

MR. WILCOX: Can I have the first slide, please. So, we have, I think, five different templates to talk about, five different topics which we developed for the Energy Commission as part of the contract.

The first one is on air conditioner sizing. And this is one of the proposals that's actually maybe a significant new and different item in the standards. And we don't claim to have the whole thing completely figured out, or exactly how it should be done, or what all the issues are.

But here's a draft proposal basically. And what this would be is a new requirement in the standards that would say that if you're going to put an air conditioning system in your house it

has to be smaller than a limit -- a size limit. So this would be a new compliance requirement.

And the idea is that you would -- the sizing requirement would be based on your proposed house and its features. That what we're really talking about here is eliminating what the industry would consider to be serious oversizing.

That we're going to take something that's as consistent as we know how to make it with the industry standard sizing approach and say you apply that in a straightforward and even-handed way to your proposed house, and that is what's going to establish what the maximum air conditioner size will be. So, your sizing for your proposed house features.

We take the industry standard calculation and put it in the ACM manual, because as far as we can tell there's no reference-able code language version of a sizing approach that we can use.

And at first blush most of that technology is in the latest version of the ASHRAE handbook of fundamentals. There's a chapter on residential equipment sizing.

We would modify that so that we get

California energy compliance measures such as radiant barriers and sealed ducts and cool roofs and the kinds of things that are specifically dealt with in the California code, so they're consistently dealt with in the sizing.

We implement things that are related to ACM calculations like the specific U factors that are used in California, and solar heat gain coefficients and all of the stuff, so it would make the thing fit within the California compliance context.

We'd have to have an approach to dealing with design data. Not clear yet whether this is per climate zone, or whether this sizing limit depends on local design temperatures, but that's clearly an issue.

It probably would, for houses where you're building multiple versions of the same model there are the same issues that you have in the current standard for multiple orientation compliance.

And probably we'd end up allowing the largest air conditioner that would be usable in any orientation to be put in any of that model house. But that's obviously another issue because

for some houses, at least, orientation will be a significant thing in the loads.

We have to figure out what to do with zonal systems and attached units, because in the standard industry approach those are dealt with differently, and we have to figure out what is a zonal unit or a zonal system, and what is an attached unit so that we can develop the rules for that.

Multifamily buildings are another issue. And probably we would, it looks like we could expand on the current performance compliance calculation approach, dealing with the whole building as a single entity. And not change that in any radical way.

So, it seems like this is, from a technical point of view, if you take this kind of approach that it's technically do-able.

There's the issue of what to do for prescriptive compliance. Whether we can come up with a per-square-foot number that allows people to comply with this without having to do any calculations. That's one approach.

A lot of people think that that's not the approach to encourage people to use; that

really what's involved here is we'd like people to do a good job of sizing air conditioners. And so giving them a square feet per ton number is maybe not the right message to give the builders.

And so the question of what to do with prescriptive cases is open, I think.

And then the idea is what happens if you really want to have something larger than -- if you want to put in a unit that's larger than what the calculations give you. Suppose your want to just be extra comfortable or whatever. And we've talked about the idea of allowing tradeoffs based on a kilowatt budget for your peak cooling. and you could then trade off with higher performance systems, better components, better ducts, better insulation on your ducts, things that would allow you to show that you're not using any more onpeak energy than you would have if you met the sizing requirement in a prescriptive building.

So, that's the approach. And that's what we're proposing to take forward and develop.

Next slide. In AB-970 we developed a set of rules for dealing with charge in air flow and as an alternate, having a TXV valve on your split system air conditioner.

And what we're proposing here is to go back through and look at those calculations based on what people have figured out with the experience there's been so far. And potentially expand that to also allow charge in air flow to be verified for systems that do have TXVs, as well as those without.

A second major issue, and one that kind of expands the issues for air conditioner system efficiency, would be to start dealing with the electricity consumption for the air handler fan for the indoor unit for a split system air conditioner.

And there are a couple different possible approaches there. One is to do something that would require verification or measurements or something so that you'd really get a performance approach and include the design of the duct system and the layout of the duct system, and the efficiency of the fan, and all of the items together into an overall consumption budget.

A potentially maybe simpler approach would be to do something that was only based on fan motor efficiency of the unit, or some approach like that. We're open to suggestions and

proposals exactly how the best way to do this is.

A third area of interest here is residential duct systems. And there are a number of issues in this area. One of the ones that people have focused a fair amount of attention up to this point is the possibility of providing better information on the impact of duct location and area and so forth to the design community so they could do a better job of optimizing duct systems.

This may be an issue that's not a requirement, but more of a design manual issue. And that's something that we'll pursue.

There's been a proposal that we prohibit unlined flex duct, which is a specific little issue that affects some systems and unlined flex duct is thought to not last very long.

The duct design procedure in the ACM manual and its verification approaches are now mostly two generations old in the standard. Things have changed. The ASHRAE standard has been revised since we did that stuff. And it may be time to go ahead and update the design calculations.

The duct leakage test which is currently

in the standard, there's been some developments and some research on possible alternative test approaches, things that might be simpler and easier to do. And we'll look at those.

The proposal to increase duct insulation requires a cost effectiveness analysis. That's pretty straightforward, you can do that pretty easily.

And the distribution efficiency calculation also could be revised and updated.

Fourth issue, residential HVAC system modeling. As Doug Mahone said this morning in the TDV discussion, there's the current residential ACMs use a seasonal efficiency model and so there's been a fair amount of work to develop simple equipment models that can be used to support the TDV calculations, and also to get better seasonal efficiency calculations than you get out of the standard calculations.

And so we'd be looking at implementing those in the ACM models probably partially as part of the implementation of the TDV approach for heat pumps, air conditioners, et cetera.

Okay, next slide. And there's a list of issues having to do with the residential ACMs

where there have been suggestions that things could be improved. Slab edge modeling has got some known issues. Natural ventilation, there's some thought that natural ventilation algorithms are over-optimistic, and we're giving too much credit for natural ventilation. And we ought to reduce that.

The dust factor that is an adjustment factor on solar gain maybe needs to be revisited now that we're changing a number of things.

Cool roofs are currently modeled only as equivalent to a radiant barrier. And there's some thought that a better cool roof model would get better design information, also give better messages to the compliance community about what worked and what didn't. So there may be an attempt to make a simple cool roof model.

And there's some issues with the current basement model, which has some problems. So that will be looked at, as well.

That's it.

MR. LEBER: Thank you, Bruce. The next presentation is Edison. Who's making the presentation? Is that Tony?

MR. PIERCE: Tony Pierce, Southern

California Edison Company. We've been looking into giving consideration to a third rating, for unitary equipment. The investigations that we're undertaking in this area are not just for residential, but we're presenting here today. It's basically a five ton and less package, split systems.

EER ratings, ARI single point ratings and the seasonal ratings may not be effective in predicting performance at part-load conditions and high ambient conditions.

We're undertaking this study of manufacture's part load data and putting that data into DOE2 models. This will dovetail with a lot of the -- some of the work that Bruce just mentioned that's being done.

We're also then taking it a step further and we're taking, right now for instance, five ton package equipment and putting it into a test lab where we can control indoor and outdoor ambient conditions so we can both dry bulb and wet bulb, and actually measure performance and conditions apart from the AIR or standard rating conditions. So that we can then generate performance curves based on the test lab, compare them to the

manufacturers' data that we've run through the simulation models.

And then either consider a third rating, new type of rating, something that the consumer can look to as a better predictor of actual performance.

We expect to have the results of this work completed in the second quarter of 2002.

MR. LEBER: Thank you, Tony. Next is Owens Corning.

MR. WARE: Dave Ware, Owens Corning, also representing NAIMA.

This proposal is to revise the mandatory minimum duct insulation from its current level of 4.2 to R-8. Essentially it would revise section 124 of the code and incorporate a new table of duct R value, deleting the current references to the California Mechanical Code.

The benefits of this essentially energy savings that it would produce, we have done some estimates of energy savings, and there's cooling savings anywhere from 2 percent to almost 5 or 6 percent; and heating savings from 3 to almost 5 or 6 percent, depending upon what your assumptions are.

I think almost more importantly or just as important is it brings the duct insulation requirements into the energy standards, as opposed to referencing them in the current ICBO's Uniform Building Code or leaves option of the California Mechanical Code.

And it allows the Commission, over time, to review and modify those duct insulation requirements as needed for purposes of these energy standards.

Next slide. This is an example of -- the bar graph on the left is really an example of what the analysis -- our preliminary analysis has shown on the potential savings for moving to an R-8 duct for a typical, again, 2200 square foot building with an energy factor for domestic water heating of .6, which is really typically used.

The table on the right is a proposal for what that table of duct insulation R values might look like. The table format is really consistent with a format that is used in the State of Washington. And it would have minimum notes associated with it, and things of that sort, which it currently is somewhat cumbersome in the table that's incorporated in the California Mechanical

Code.

Next slide. Obviously moving up to a higher duct R value it is cost effective and there's a great persistence of energy savings over time. And it makes the California code more consistent with the requirements of surrounding states, many states in the country for that matter. And it represents the typical product type that is actually sold and distributed throughout the country by manufacturers of duct products and manufacturers of the Air Diffusion Council.

The actual incremental cost to the builder is only about $80. So the price of R-8 ducts has come down significantly. And according to John Lanborn of J.P. Lanborn, the actual incremental cost to a typical 2000 square foot ranch home, assuming about 90 -- have to look at my notes, but assuming the typical amount of product that is sold to the builder for that kind of market, the incremental cost increase is only about $80.

So we feel that not only is this proposal cost effective, but it does, indeed, provide significant energy savings for the state

and to the homeowners.

MR. LEBER: Thank you, Dave. Steve, are you speaking for Hirsch?

MR. GATES: Yes, Steve Gates for James Hirsch and Associates.

Just to expand on Dave's comments with increasing R values, residential duct in unconditioned spaces, my studies that I have conducted on both homes I've owned, as well as friends' homes, have indicated that on peak conditions the very hottest days in Sacramento it's not uncommon to get an average of a 3 to 5 degree temperature rise between the air handler and the diffusers, the registers in the space on the 105 degree days.

The overall temperature change between the supply and return is on the order of 16 degrees. You very quickly conclude that with a 3 to 5 degree rise that onpeak we're looking at 25 percent thermal loss which has nothing to do with air loss. There's been 25 percent thermal loss just through ducting running through attics.

So, if anything, I think Dave's numbers in terms of what the potential savings are may be on the low side, but even if those are typical for

annual savings, in terms of peak savings there are significant differences.

And particularly since the Commission is as concerned as it is with time dependent valuation, sizing of air conditioning units, it certainly makes sense to go to the highest performance ducting that can be justified economically.

In addition to the R-8 value I would also recommend the aluminized outer skins that's available in some of the duct products, so that the issues that have already been discussed with radiant on duct work can be minimized.

Thank you.

MR. LEBER: Thank you, Steve. PG&E.

MR. MAHONE: Marc Hoeschele from the Davis Energy Group is going to present these topics.

MR. HOESCHELE: Hello. There are three cooling related technologies that we're going to be looking at. The first is evaporatively cooled condensers.

And this is a technology where the condensing coil, instead of being exposed to outdoor air conditions to reject heat to, the coil

is immersed in an evaporatively cooled water bath, which provides much more favorable conditions for heat rejection.

Not only do you have better heat transfer with refrigerant to water, but you also have a condition where the water temperatures are dictated by the wet bulb condition of the outdoor air versus conventional air cooled air conditioners where the dry bulb temperature is the driving factor there.

There's PG&E, Davis Energy Group and Proctor Engineering, among others, who have done a lot of monitoring work on this technology over the last few years. And both in laboratory and field studies.

And what we've seen is that by immersing the evaporatively cooled condensers can result in peak condensing temperatures that are 30 to 40 degrees lower than what an air cooled system would see under design or temperatures exceeding design conditions.

Again, this is due to the system operating in response to wet bulb, outdoor wet bulb, which is typically in the range of low 70s versus the 110 degree conditions.

So what you get with this technology is a much more efficient cooling system with much more stable capacity through the range of operating conditions.

In environments where you have really high design temperatures, the southern deserts and so forth, you can certainly realize capacity downsizing credit up front where you might be able to install a half ton or a ton smaller unit because of this stable capacity output.

On a full year basis you're looking at roughly 30 to 35 percent energy savings versus a 10 SEER air cooled system. And from a peak demand viewpoint it's even better because under all peak demand conditions you have very dry conditions. So the evaporative condenser, the performance almost gets better as the conditions get drier.

The next slide shows a graph of some data that we took when we monitored a unit on our office building a few summers ago. On the left axis is condensing unit demand in kW; and then the bottom is 5 degree bins of outdoor temperature going from 65 to 110, I think.

The line there shows what a 10 SEER unit does based on PG&E laboratory testing, so the EER

is falling off, because this condensing unit only EER, from around 14 to below 10 at the high conditions.

The bars shown there are what the monitored performance was on the unit we had installed on our building. It actually shows, you know, pretty level performance, and in fact at this highest bins we're showing a slight upward trend as the outdoor conditions get a little drier.

So, you know, clearly this technology offers a lot of promise in both energy and demand savings. And we need to accurately represent it in the standards.

The one manufacturer that was producing the unit is no longer. They weren't financially solvent enough. But they sold several hundred units in California. And there's ongoing efforts to interest other parties in producing this system.

MR. LEBER: We need you to move a little faster; you have two more minutes to get through your other two templates.

MR. HOESCHELE: Okay. Moving on to night vent cooling is the next slide, please. Is

a system which is currently being developed under a PIER contract.

There's basically two facets to this. One is the concept of whole house fan ventilation and benefits of ventilating the house at night and precooling building mass for the next day. And the other relates to this PIER work where there's a hardware basically of integrated residential economizer with controls which allow the occupants to set a desired temperature.

And the system will automatically, with its variable speed fan, operate at varying fan speeds through the night to achieve the desired condition in the morning.

And this has the benefit of not having any security concern, since all the ventilation ducting is in the attic, so that you don't have to leave the windows open. Exhaust is to the attic and supply is through the duct system.

The next graph shows some data from monitoring the Davis Energy Group did as part of this development work. And it's basically two very similar days of outdoor temperature peaking at about 95.

And one day shows the air conditioner

system operating without the ventilation mode, as a normal person would operate their house. And that shows the minimum indoor temperatures not getting below 70 in the early morning on this relatively hot day. And rising through the day until around 5:00 or so, the occupants turn on the air conditioner, either manually or by thermostat control. So the air conditioner needs to run several hours to run the temperature back down.

The other case, which again was for a day with very similar outdoor conditions, shows -- and that's the lower indoor temperature line there, it shows the night vent system running through the night, precooling the house to a point where in the early morning hours it's close to 60. During the day the indoor temperature ramps up, but never reaches a condition where the air conditioner needs to run. So you're using offpeak energy to precool your house.

Building mass is a key component of this, as well as climate differences. So those are things that we would look at.

The next slide relates to advanced evaporative cooling technologies. And currently direct evaporative coolers are credited with an 11

SEER rating and indirect/direct receive a 13, given some eligibility criteria.

We've been doing lots of monitoring on evaporative cooling systems throughout California on different types of systems and find much higher performance values than that. If you're looking at equivalent SEERs you're looking in the mid 20s or so.

So, what we want to do is to get an accurate representation for evaporative cooling in the standards that would credit them. There's work going on ASHRAE to look at effectiveness issues and a way of rating.

The rating side of the equation is not that strong at this point in time as far as how the equipment is rated. And eligibility criteria is an issue.

The next graph just exemplifies what evaporative cooling can do. This was one house where on one day the occupants -- the outdoor temperature line is missing here, but they were very similar, I think low mid 90 consecutive days, so this is two days worth of data. The blue line is indoor temperature over the day, the two days.

The first day the occupants ran the air

conditioner and that's the demand plot there in red, as we're getting up to around 3 kW for the system.

The next day they ran the evaporative cooler, which was a variable speed unit, so it's only going to run the fan as hard as it needs to to meet the load. And you can see the demand was around 500 watts for that, and maintaining comparable indoor temperatures.

So the potential for evaporative cooling is significant. The one issue is whether -- the building design is a key component of making evaporative cooling work, so if we want to propose an evaporative cooling package house so that you cannot use a high SEER rating to fully trade off against other energy features which may make the technology not work properly in the application. So that's something that we need to look at.

Thank you.

MR. LEBER: Thank you, Marc. So, questions and comments on HVAC? The first person with their hand up in front of me, at least, Steve.

MR. GATES: Yes, Steve Gates with Hirsch and Associates. I've got a question for Marc,

actually a couple questions for Marc from Davis Energy.

With the evaporatively cooled condensers, have you found any issues having to do with fouling factors? How do you control, in a residential environment, is fouling of the condensers an issue with build up of scale, you know, if the water's not properly -- or are there any issues along that line that may result in a long-term deterioration?

MR. HOESCHELE: Yeah, the manufacturer that was producing these units produced on the order of hundreds or maybe a few thousand. I mean that is something that needs to be looked at, and there are issues related to that. Maintaining water quality and bleed issues, you know, is the whole contractor education part of things that they set these systems up properly.

Some are set up with no bleed systems, and then you're in trouble. So there are issues that need to be explored and eligibility criteria and so forth.

MR. GATES: Because with commercial cooling towers and flue coolers, it's critical actually, in terms of keeping those running long

term, it's critical that you actually have a water treatment program. Not just bleed, but actually, you know, anti-scale chemicals into the water.

And as a commercial HVAC engineer for a number of years, I had experience with towers that just simply weren't maintained well. And actually got very badly fouled up and ruined the chillers.

So I would urge that you do investigate that. It's very appealing, you know, the fact that you can get a 30 to 40 degree drop in saturated condensing temperature, that's fantastic. But one of the real keys is -- to maintain with whatever the standards are going to be implemented, as part of that.

I also have another question for you on this evaporative coolers for houses. Actually, several years ago I went ahead and put a large, window mounted evaporative cooler in my house. But found that -- and this is well known in terms of ASHRAE comfort that you can't look at equivalent temperatures, so my house with the air conditioner running at 78 was quite comfortable. Evaporatively cooled to 78 it was quite uncomfortable.

And in fact, after I yanked the cooler

out after the end of that summer because the house started smelling moldy.

What issues in terms of controlling humidity and mold growth -- do you see issues in that realm in terms of using evaporative coolers in houses?

MR. HOESCHELE: Well, I lived for two summers in a house with the cooler that we developed through the ETAC program, the one where the data was from. And I share some of your concerns.

And I mean, that's part of our thinking in that we need, we might want to consider looking at a package that integrates efficient building design with less glass and orientation, you know, basically a passive solar design that you carefully apply this technology in a way that you don't run into these problems.

Because as you realize, having lived in the house, too, when this unit runs a lot is when, you know, you start to get these moisture issues and so forth. If you can run it for three or four hours a day, it's okay. But in a heat storm we have to run it 12 hours, you know, it gets humid and your refrigerator sweats and all that.

So, that's why I think we want to look hard at how we're going to structure a better credit for the technology.

MR. LEBER: Noah.

MR. HOROWITZ: Noah Horowitz, NRDC. This is directed to the consultant team and/or staff.

A question, I noticed you said we might take a look at the sampling protocol for tight ducts, and a lot of energy unintended went into setting that up last time. That was pretty contentious.

I think it would be worthwhile to take a look to see what pass/fail rate we are seeing. And based on that, adjust upward or downwardly as appropriate.

MR. LEBER: Other questions, comments? Jon.

MR. McHUGH: This is John McHugh with Heschong Mahone Group. I just wanted to bring up that the work that Southern California Edison is doing in terms of looking at SEER and EER performance over the range of temperatures that air conditioners see over the course of the year is in line with the kind of work that we're doing

for time dependent valuation of buildings and the air conditioning models that are in the TDV model.

We specifically -- we got cut off earlier on and so we were going to talk about the three cases that we'd be looking at.

The first case is a builder only wants to specify the SEER of their piece of equipment. In that case the basecase of the building in all cases would treat the performance of the equipment based on the performance of the 50th percentile of equipment that exists over the range of temperatures.

So for a given SEER there'd be a given performance curve in terms of how much the performance degrades as the dry bulb temperature increases.

If the builder is specifying only the SEER the performance of their equipment would have the SEER fixed at the rating point of the SEER, and then the performance would degrade according to the 15th, or 1-5 percentile of equipment. So they'd be somewhat dinged for not providing the performance of that equipment over the range of temperatures.

The second method of compliance would be

to actually specify the SEER and the EER of the equipment, and then that would define a different curve for the performance of the equipment over the range of dry bulb temperatures.

So if they stated that our SEER and our EER are going to be above these particular values, then that would define that curve.

And so the work that SCE is doing will actually help this process because part of their work, I assume, will be involved in drawing those curves for knowing those two points.

And then finally the most defined case would be that the builder actually specifies the make and model of the equipment that they want to use in that particular home. And then would then enter the performance information of the equipment over a range of temperatures. And then that would define the curve.

So, we have three different methods depending on how much information the builder wants to provide at the time of filing their building documents.

So that was just to inform the information about air conditioner.

I actually have a couple other comments

related to duct work, and one of these is that the time dependent valuation has a duct model in there. It also takes a look at the impact of cool roofs and radiant barriers so that some of the questions that were brought up we're actually developing a process for evaluating those types of measures.

And Dave had also brought up the issue of having R-4 insulation on duct work in conditioned spaces, and I'm not quite sure what the motivation is for having insulated ducts in conditioned spaces?

MR. WARE: Dave Ware, Owens Corning, also representing NAIMA. The table that I -- I think you picked that up from the table. Those are for operating temperatures at the extreme end. So very cold operating temperature or very hot operating temperatures in conditioned space, then the proposal that even though you're in conditioned space, to maintain that air within those operative constraints it ought to be insulated. So that's where that R-4 comes from.

MR. McHUGH: But under normal situations you have wouldn't have that requirement?

MR. WARE: That's correct.

MR. McHUGH: Okay.

MR. WARE: And that table delineates those conditions.

MR. McHUGH: Okay, thank you. And then I guess the one last comment is that I think it's a great movement to move from R-4 to R-8 in that, you know, we're putting R-30 or R-38 in the roof, you know, where we might have a temperature differential from, you know, the air inside of the space being 70 degrees to, you know, in excess of 100 degrees up in the attic.

We have a greater temperature differential of that cold air in the duct to what's in the attic. The other question that it brings up is whether or not we should be moving ducts inside of the conditioned space and actually get the benefit of that R-30 or R-38 that we have in the roofs.

Thank you.

MR. LEBER: Bruce.

MR. WILCOX: I had a question for Tony. One of the issues, I think, in doing these more detailed models of this equipment is how good is the information that the designer has about the equipment and how good is the manufacturer's data

and all that stuff.

And it seems to me that you guys are proposing to make some measurements that are very relevant to that. It's not clear to me how many systems you're proposing to measure, and whether we're really going to -- if this is second quarter or next year. If that's June, that's kind of late for this process. I'm wondering if there's any chance that we can get some information sooner.

MR. PIERCE: Tony Pierce. It's a good question. It's really two separate studies that we're doing. One is the investigations of manufacturers' data that's available, and that we expect to have out more in the first quarter. I think that's -- some of the work we are doing.

The testing that we're doing is what I mentioned would be completed and available in the second quarter. It's somewhat limited. We're looking at three manufacturers, two different units from each manufacturer that are Title 24 compliant, Title 20 minimally compliant unit, and then there are high efficiency unit, the market.

And we're looking at whether, you know, I didn't mention what we would call this other rating, but it could be something like an

integrated part load value where we extrapolate the data. So instead of 95 degree ARI, we're wondering what is that performance or that unit. It's been designed to give a high SEER and maybe a low EER value. How does it perform when the ambient temperature is 125 degrees.

MR. ANDER: First, they're all 5 to 10 capacitors, also.

MR. PIERCE: Yes. It's premanufactured. So there's six units, you know, and then we'd like to build on that.

MR. WILCOX: But you're not likely to have anything really for us until toward June?

MR. PIERCE: Well, that's -- trying to be a little realistic. We're testing the first unit right now.

MR. WILCOX: Okay.

MR. ANDER: I can tell you what our timetable is, it's to have them done by the end of February. So, there's a little bit of sloppy built into there.

MR. WILCOX: Okay.

MR. ANDER: So it's possible before June.

MR. LEBER: All right.

MR. PIERCE: Well, I just had -- we can certainly share with the team interested in this information on units as we get it.

MR. WILCOX: That would be useful, thank you.

MR. DAY: Michael Day, Beutler Industries. Along the same lines we wanted to see EER be instituted as an option for some time. We think that there's some great value there.

But one thing that we find on sort of the sharp end of the stick when trying to implement this, for example, with local utilities is that EER is not an ARI rated number for most of the equipment that we'll be using. It's a -- SEER is actually a derivative of the EER, but the EER is not rated by ARI for most of the equipment that's going into residential units.

Part of what I think we might end up running into a problem with if we try to go to an EER, is sort of the Balkanization of the EER data based on different temperatures. I can understand why we want to get it, but considering the fact that ARI is not even rating EER at this point, we might be better off sort of crawling before we try to run a 100 yard sprint, in getting the ARI data

at 95 degrees, and getting the manufacturers to a point where they're actually rating that and listing that on their web-based ratings, as opposed to now where the EER is not even required to be part of their rating out of the box. Or certified.

MR. PIERCE: Tony Pierce again. I'm not sure what you mean when you say ARI is not -- you look up the ARI database it does have SEER and the EER.

MR. DAY: Not -- well, --

MR. PIERCE: -- they are --

MR. DAY: They are two different items. First off, on primenet, not everything that has a certification number has both its SEER number and its EER number listed through primenet.

And the ARI's justification for that is that they certify the SEER, but they do not certify, for most of the residential equipment they do not certify the EER.

So, ARI is standing behind the SEER rating, but they're not standing necessarily behind the EER rating.

We just got done with a program with SMUD where we went through about 100 different

combinations, and the vast majority of those that are listed online do not have their EER numbers listed and certified by ARI.

And the reason we were given by ARI and by the various manufacturers was that that number, that EER for noncommercial, for residential equipment, is not an ARI certified number.

So we have to get to that point if we're going to plan on using it in any sort of certifiable fashion.

MR. LEBER: Thank you, Michael. Lance had a --

MR. DeLAURA: Actually I'll defer to Marshall because I think he's going to do a followup to this, and then I'll ask a different question.

MR. LEBER: Okay.

MR. HUNT: Unless, Tony, you want to go first?

MR. PIERCE: Yeah, just real quick. If you look at our template -- of EER versus SEER, and that is from the ARI database, the coolnet, I haven't found one that doesn't list both EER and SEER.

They may not be certified numbers. I

think ARI actually calls them a reference -- I don't know where they stand on that. But they are both in there, that's what we used as a basis for illustrating, and it's much better described in our template than what -- in terms of how you can look at a range of EER and a wide range of SEER and can see where manufacturers have focused their development obtaining that high SEER rating.

MR. HUNT: Marshall Hunt, PG&E. I think what we have here is sort of a nomenclature problem. But the bottomline is that all you have to do is download the full database. This primenet that's mentioned is a quickie method to look up some data. And it's just sort of an ARI problem with the way they choose to display the data.

But talk to Mike Martin and you'll get the real story about the fact that EER is available. And so I don't think we're all held up. So I disagree that it's a problem to get.

Thank you.

MR. LEBER: I think Noah had a question on --

MR. HOROWITZ: Never mind.

MR. LEBER: Oh, you covered your point,

okay. Anything else on this same point? Okay, Doug.

MR. MAHONE: I just wanted to point out, as Jon was describing, under the way we're proposing to do it under TXV, you don't have to come up with the EER value for a particular unit. In fact, if you want to be unconstrained by EER you wouldn't have to be. It's just that you would get kind of -- the standard would assume that you're putting in a crummy unit. So you basically take a slight performance hit for not specifying.

So there's an incentive to both the builder and the manufacturer to come up with the EER number, because they will be able to get credit for better performing units by providing that data.

MR. LEBER: Jim, did you have -- no. So, nothing else on that subject? A different subject? Oh, well, --

MR. DeLAURA: Different subject, this is Lance DeLaura with SoCalGas. Relating to the TXV question or the concept, my understanding is that right now the way the rules are, the TXV is an alternative to having the onsite inspection.

And what I think I heard is that the

proposal is for the future to have an inspection in either case. So if the TXV is present or not present in new construction it would still be inspected.

MR. PROCTOR: As to whether it's a credit, so for example on a TXV it could be a credit to inspect if you have the right amount of charge in air flow, as opposed to trading off one against the other.

MR. DeLAURA: Okay, thank you.

MR. LEBER: Noah.

SPEAKER: John is frowning, this John is frowning, so --

(Parties speaking simultaneously.)

MR. LEBER: I'm not sure if the answer matched the question or not.

MR. PROCTOR: I only heard half the question, so --

(Laughter.)

MR. DeLAURA: Well, let me ask it again. And I was asking it a little bit on behalf of CBIA because they weren't in the room when this came up and I know this was an issue for them.

The question was the way I understand the rules today TXV installed in air conditioning

does not require an inspection. That TXV does not.

MR. PROCTOR: No, it does require an inspection.

MR. DeLAURA: Okay. So what's different in the proposal then, that's my question. What's different in what you're proposing --

MR. PROCTOR: Well, right now the inspection on a TXV is whether or not there's a TXV there. And the inspection on the non TXV is whether or not you have the right amount of charge in air flow.

So, what we're talking about here is when the TXV is installed we would still like to get the right amount of charge in air flow even though it's a TXV. So the addition would be on the TXV side to get more energy savings and the like.

MR. DeLAURA: Thanks.

MR. LEBER: Other questions?

MS. HEBERT: Elaine Hebert with the California Energy Commission. This is just a, it's a general question, point of clarification, and anybody can answer, but Marc might be the most qualified.

If we see widespread use of systems that use water for space cooling, as in evaporative cooling, are we talking a lot of water? And suppose we have a drought year and we have water restrictions, are we looking at a possible, you know, restriction on the use of water for cooling? Would that be a problem?

MR. HOESCHELE: Marc Hoeschele, Davis Energy Group. I know some jurisdictions have requirements on water use of evaporative coolers and so forth. And I don't think they're particularly restrictive for the products that are out there.

I mean a typical evaporative cooler or the evaporative condenser that we monitor use on the order of five to seven gallons an hour under the hottest conditions. And that would be a combination of bleed water and whatever is being evaporated.

So if you compare that to, you know, irrigation uses, which might be, you know, 500 to 1000 gallons a day, you know, it certainly is an issue that has implications, but it is not the huge use of water.

MR. SHIRAKH: Marc, a question for you.

You mentioned that the equivalent SEER number is about 20 or so? What that means is a lot of tradeoffs against --

MR. HOESCHELE: Right.

MR. SHIRAKH: -- against other building features. And I know from experience that a lot of people just don't like the feel of swamp coolers. I happen to live in a household where my idea of putting a swamp cooler has been decisively vetoed several times --

(Laughter.)

MR. SHIRAKH: It's possible, you know, when you do all these tradeoffs and then somebody a few years down the line decides to take it out and put a regular compressor-based cooling system.

Have you thought about the implications of the --

MR. HOESCHELE: That is something we need to think about, and that's kind of part of the direction towards having a package that has other restrictions where you can't, you know, essentially you wouldn't be trading off so much. You'd have efficient building design and an efficient system.

But maybe it's a very streamlined

package for the builder that makes it easy to build, but there are some constraints.

MR. GATES: Just to expand on the issue of water usage in evaporative cooling, my masters thesis actually looked at evaporative cooling in Sacramento for a 2000 square foot house, and that was one of the issues I addressed at the time.

It turns out that the annual water usage of a swamp cooler is about the same as the water that is consumed by a 10 foot by 10 foot patch of lawn.

So, you know, to put it in perspective, it's not a significant issue. And then particularly if you look at -- well, actually, I guess most of the power plants in California that are water cooled tend to be on the coast, but, you know, you can also look at the fact that if you generate electricity and then have to cool the power plant, that you're consuming water there, also.

So I really don't think the water is a significant issue. It's more the issues of discomfort or mold. I mean that's why I installed this evaporative cooler in my house a couple years ago, is I wanted to test out the premises of my

masters thesis. And I concluded I was way off base.

(Laughter.)

MR. LEBER: Other questions? Mazri, did you have -- that was it, okay.

Well, we're maybe even a few seconds ahead of schedule. So, move on to water heating. And Dave Springer has a presentation on that, is that --

MR. ELEY: Dave deferred to me.

MR. LEBER: Charles Eley has a presentation on that.

MR. ELEY: There's a couple of recommendations here. The first one is to try and close the gap between the water heaters that are commonly on the market, installed in buildings, and the minimum NAECA requirements.

So, with this, Davis Energy would look at the possibility of heat traps and/or exterior blankets to supplement the NAECA minimum requirements. This would become the baseline case that you'd trade off against.

The gap will, I should mention, be reduced in, I believe it's January of 2004. Federal standards for water heaters become more

stringent on that date. And so we won't have the big gap that we have right now. So that's expected to take effect before these standards.

Next slide, please. The next idea is to use, especially for multifamily buildings, is to use something more akin to the custom budget approach for water heating.

Right now if you look at the ACM manual there's an equation in there that gives you the water heating budget as a function of the conditioned floor area of the building. It doesn't account for anything else.

So, we have a problem right now, especially with multifamily, where the budget is based on every apartment having its own water heater. And simply by having a common water heater in the building which, in my opinion as an architect, is probably more -- that decision is based more on whether you can get a flue out of each individual unit or not, and not so much on the economics of it.

So this would take factors such as that and make them neutral in the compliance process. So, if you had a central water heater in your proposed design, the budget building would also

have a central water heater, for instance. That consideration would just become neutral.

There may be a few other things that we will look at as being neutral, as well. But the number of water heaters is the primary thing.

Next slide, please. The third idea is to address what some people perceive as a problem with pipes located either in slabs or below grade. These are commonly not insulated. And it takes a long time for the water to warm up.

And this would -- with this measure we would look at the possibility of requiring that pipes located in those situations be insulated. And in the same time we'll probably also look at the distribution system multipliers that are currently in the standard right now. There's multipliers for point of use, recirculation and so forth.

One of the problems there is that when those distribution system multipliers were first developed they were -- they're appropriate, I think, for single family homes, but again not multifamily homes.

So, at a minimum, we'd probably want a separate set of -- if we stay with this scheme, a

separate set of distribution system multipliers for multifamily; maybe even key those to the size of the units.

Because when these multipliers were calculated, you actually set up a topology of the piping layout so you know the length and diameter of each pipe in the circuit and how long it takes them to fill up with water and so forth. And that whole network was set up to be appropriate for single family homes. Yet the multipliers are currently being used for multifamily.

Next slide, please. Then the final idea here is to improve the water heating calculation method so that they're capable of generating hourly results. This is something that's needed to support the time dependent valuation proposal.

The current Energy Commission procedure is what's called a load dependent energy factor. The energy factor that USDOE calculates is based on a set of specific conditions, a certain tank temperature, a certain daily draw and so forth. When you vary those conditions this affects the efficiency.

So the load dependent energy factor makes adjustments to the energy factor for the

actual demand on the water heater, the load on the water heater.

And the Energy Commission procedure can be fairly easily adapted for hourly use. And this is a fairly straightforward change. It would impact the ACM mainly. It would not, to users of MICROPAS or ENERGYPRO everything would look the same as before.

That's it.

MR. LEBER: Thank you, Charles. PG&E, HMG?

MR. STONE: Nehemiah Stone, HMG for PG&E. I'm not going to spend a lot of time on the first slide because much of the work that we're doing for PG&E is in support of what the Commission is doing on water heating and Charles covered it pretty well.

I would like to talk a little bit about the last item. As we find the problems with applying the residential standards to multifamily, as we find out where those problems are, most of it comes down to two things. One being water heating and the other being glazing area.

And simply by going to the custom budget that Charles was talking about for multifamily we

eliminate an awful lot of the problems.

With the work we've been doing recently with Edison we've found that by doing nothing, other than going to an instantaneous central water heater, a lot of multifamily buildings can immediately, without doing anything else, get 25 to 35 percent better than the standards.

And that allows them to tradeoff everything. You find that they're down to the minimum mandatory measures for insulation everywhere. They go with single glazing. They can do almost anything simply because they've made a decision that is based on economics. Unlike what Charles said, it is based on economics. It's cheaper to put in that central water heating system than to put in 102 individual water heaters with gas piping and flues throughout the building.

So, they've made the cheaper decision in the first place, and they get all these energy credits to trade off against everything else in the building. So there's very strong incentive to fix that problem.

Next slide. This is kind of lumped in at this point, even though we're supposed to be talking about water heating, because there's no

really good place elsewhere to put this into the discussion.

But this is basically all the multifamily issues. Our proposal is to establish a standard specifically for multifamily because it is significantly different from other nonresidential buildings, and other residential buildings.

And the proposal, in addition to being a standard by itself, would have new prototypes that take into account what people are actually doing. And the ACM would have switches that help to establish the custom budget for those types of construction.

Many of those decisions about what's being done for the wall framing or for the type of system have nothing to do with the energy code. And giving a credit or a huge penalty for making those decisions is not really appropriate for the code.

As far as the envelope and equipment measures go, we have a significant amount of data from buildings we've been looking at for PG&E, for Edison and for SDG&E on what is common out there; how much credit you get for various things against

the current code. And we've gone a large step towards figuring out what is the cost effective next level to go to to get rid of many of the games.

One of the differences from single family is we're looking at a window/wall ratio rather than fenestration to floor area ratio. It makes a lot more sense when you consider that some of the multifamily units will have one wall that has windows in it, being in the middle of the building. Others will have two walls. And fenestration by wall area, then, makes a whole lot more sense than trying to set it by floor area.

I think I've covered it all.

MR. LEBER: Thank you. Next I guess is you, Steve.

MR. GATES: I think one of the nice things about the energy standards in general for buildings is that even though the primary goal is to reduce energy consumption, most standards actually result in improved occupant comfort.

It's pretty easy to make the case in terms of say wall insulation, high performance glazing, those types of measures that for a given temperature in the building that the people are

actually more comfortable. And that the radiant temperatures are better. It's actually a nicer environment.

Unfortunately, this concept to date really hasn't applied to hot water usage in the building. The standards for a couple decades now have mandated low flow faucets, low flow showerheads, but they haven't addressed the other part of that system which is how quickly can you deliver hot water to the end use.

And the fundamental problem is that the hot water piping is sized in accordance to the Uniform Plumbing Code. The Uniform Plumbing Code was developed in the early part of this century. Based on calculations I did over a decade ago, my conclusion was that the standards were based on delivery at least 7 gallons per minute to an end use, which is exactly counter to what the current standards ask for.

The standards do not want 7 gallons per minute on a bathroom sink fixture; they only want 1.5 gallons.

So the net result is you turn on the water and you have a very large diameter pipe with a lot of volume in that pipe. And it can take

forever to get the water there.

So, it's a problem that's very easily solved simply by readdressing what water demands are in California houses, in terms of current standards. And if that was addressed, piping sizes could be easily a size or two smaller in a lot of cases. You'd then get a higher velocity of water through the pipe. You could deliver hot water to the end use much more quickly.

Also, since you have a smaller pipe, the cost effectiveness of it is obvious. It doesn't cost more to install a smaller diameter copper pipe than a larger one. You'd actually save money initially.

So, to me, it's a no-brainer. It's something that badly needs to be addressed so that the overall system performance of a hot water system is improved.

Next slide, please. Related to this is the specific demands in a kitchen. And Bruce already talked about this somewhat in terms of particularly if you have pipes located underneath the slab that are uninsulated. You can take a long time to get the water to heat up when you do draw it.

The other factor that happens is that as soon as you stop drawing the water, it starts cooling down very rapidly. This can seriously impact the performance of a dishwasher. You know, a dishwasher takes several draws of water, but those draws of water are spaced out over what, 45 minutes to an hour typically. So it's very common, if you have a dishwasher served by piping either under a slab or up in an unconditioned attic, that every time the dishwasher wants to draw a new load of water, the water's cold.

I personally have experience with this. I've owned two houses with under-slab hot water piping. In the second house a couple days before the slab was poured, I went out there and insulated the hot water piping, myself. It completely eliminated the problem of the excessive cool down between dishwasher draws. That house I could actually maintain about a 20-degree reduction in the water heater temperature and have the dishwasher work at least as well.

So, my recommendation here is that regardless of whether all hot water piping is insulated in the house or not, certainly the run out to a kitchen should be insulated. And, in

fact, ideally the run out to a kitchen should be a dedicated run so that you don't have several bathrooms, you know, t-ing off of this pipe, and then, you know, thereby forcing the diameter of the pipe to be bigger.

It makes much more sense to have a small pipe that runs directly to the kitchen, and then insulate that pipe. And that will improve the performance of both dishwashers as well as just during general food preparation and cleanup afterwards.

At the beginning of a meal you can draw water once. Once that water's hot, then every time you open the faucet, even if it's 10 or 15 minutes later, the water's still going to be warm. You don't have to keep running water to get it warm again.

Next slide, please. This final one is just based on my observations in both homes that I've owned, as well as toilet rooms in commercial buildings. Wherever you typically see a mixing faucet in a bathroom the position of that faucet is almost always in the middle position. And the reality is that most people do a very quick rinse on their hands and they're done.

Clearly if the faucet's in the middle position you're constantly drawing hot water from the tank. In a residence the hot water never even has a chance to get warm. It just helps to heat up the pipe a bit. The person's done with the water before it even gets to the faucet and they shut it off again.

So, an obvious solution to this is to not allow single lever mixing faucets in bathroom type applications. Two-lever faucets are obviously very common. In fact, my impression is, based on a lot of the model homes I've looked at lately, that it actually is the style now. It's far more common in new homes to see two-lever faucets than the mixing faucets that were so common ten years ago.

So it would be a very logical item to address in the new standards. Basically setting up the requirement that if somebody wants hot water they actually have to open up a lever, a valve that provides them with hot water. Rather than by default providing hot water unless you specifically turn the faucet all the way to one extreme so that you only draw cold water.

Thank you very much.

MR. LEBER: Thank you, Steve. Bob Hutslar.

MR. HUTSLAR: Bob Hutslar with Laing Thermotech. And our template is the review and update of current multipliers for domestic hot water recirculation systems.

There are many new types of systems that are currently on the market and the multipliers basically are based on systems that are quite old. There's several new systems on the market that would be penalized if required to assume that they operate under the same assumptions that were used to create the current multipliers.

For example, there are many under-sink instant hot water delivery systems that are on the market today, either temperature controlled and timer controlled systems, or on-demand type systems that operate much differently than systems did years ago.

Hot water recirculation systems can save on the average 15,000 gallons of water a year. Not to mention the associated costs to heat that water, treat that water and treat the sewage for that water.

So our proposal is to review and update

the current multipliers for domestic hot water recirculation systems.

Thank you.

MR. LEBER: Thank you. Which brings us to questions and comments.

I guess I should start on the left this time. Bill.

MR. MATTINSON: Bill Mattinson with CABEC. I'm just wondering something I didn't see here was is there any consideration of reviewing the basic assumption that every house in California uses 50 gallons of hot water a day whether it's 400 square feet or 40,000 square feet.

The upshot of that in compliance calculations is water heating doesn't matter in a big house and it's everything in a small house. You do a small studio or granny unit. We're seeing a lot of homes with second units built above the garage with a separate water heater. That's the whole budget.

MR. ELEY: The water heating budget does scale a little bit by house size, but it's capped --

MR. MATTINSON: It's --

MR. ELEY: -- at 2500.

MR. MATTINSON: Yeah.

MR. ELEY: I should have mentioned this, I guess, during the presentation on the calculation methods. But when we move to an hourly calculation method then we also need an hourly schedule of hot water consumption.

And we might as well use gallons per day or gallons per hour, really, instead of what we have now, which is just the Btu budget.

And the model that we've looked at so far is a published document by Jim Lutz, who's actually here in the audience, from Lawrence Berkeley National Laboratory. They developed a model that predicts hourly consumption given demographic factors about a house.

Of course, in the compliance process we don't know how many occupants are there; or whether there's children of preschool age or school age and things like that. So we'll have to make some assumptions about those.

But once we do, then we will have to agree on an hourly profile for water heating consumption.

The hourly profiles can vary by weekend

and weekday. And even by season.

MR. MATTINSON: So that -- are you telling me that that will include looking at a variable --

MR. ELEY: Well, I think what --

MR. MATTINSON: -- per house?

MR. ELEY: -- I guess what I'm saying without -- now, I'll try to answer your question. Sorry.

(Laughter.)

MR. ELEY: When we open this issue, I think, --

MR. MATTINSON: That will be on the table.

MR. ELEY: -- we'll have to address --

MR. MATTINSON: Okay.

MR. ELEY: -- house size and how that relates to consumption, yeah.

MR. MATTINSON: Thanks.

MR. LEBER: Other questions? Dave.

MR. WARE: It's more of a comment. Both to Charles and to Nehemiah. In my previous presentation on energy tradeoffs -- I guess I -- the CEC and Charles' network, we didn't look at multifamily, but certainly we could have, and you

know, it's obvious we know how the water heating budget works. And we know that the house size -- the proportion of the water heating budget is basically is the budget and multifamily building is just even greater than the slides that I had.

As Nehemiah pointed out, that instantaneous is a give-away. So, you know, I support that effort. But, I guess my concern and just caution is that we move into an hourly schedule or take a look at that, that we be cognizant of the fact that the budget, per se, for water heating is so easy to trade into other stuff, that we understand how that works.

There's a need and desire to look at real time pricing issues, TDVs and things like that, but we need to really be cognizant of what we're gaining in that whole process of being more sophisticated in how we look at water heating issues.

MR. LEBER: Other comments? Ahmed.

MR. AHMED: Ahmed, SoCalGas. Several comments on the water heating issue.

We would be opposed to the idea of requiring heat traps and blankets to the water heaters just because they happen to exceed the

current NAECA standards.

As Charles pointed out, by 2004 the federal standards are going to change anyway. And perhaps we should wait till we find out what exactly the federal standards are going to be before we decide --

MR. ELEY: Well, we know what they're going to be.

MR. AHMED: What is it going to be?

MR. ELEY: Well, the intercept goes up by 5 percentage points. So right now it's .62 minus -- Jim would know this -- and it goes, instead of .62 it becomes .67 for gas water heaters.

MR. AHMED: Exactly, so therefore they have to meet that standard --

MR. ELEY: So we know what the standard is going to be.

MR. AHMED: Right. So, we don't see the wisdom of trying to require additional features just because the current water heaters are not available in the market just because they're cost effective, and they're meeting or beating the standards, that they should be penalized further.

I mean there are air conditioners that

meet the federal standards or even exceed; there are other appliances and equipment that exceeds the current standards that are set by the federal government. And we don't penalize those.

It so happens because we're seeing that there is a tradeoff being done in the multifamily market for water heating and there's some discrepancies. And perhaps we should address those discrepancies rather than requiring the water heater to meet a higher standard than what it is already doing as far as the NAECA standards are concerned.

The other comment that I had was on the design of the water heating system that Steve Gates mentioned, about requiring the piping to be reduced.

I think we have to be careful because typically mechanical engineering design requires a certain piping size based upon velocity of water flow. So if we were to reduce the pipe we could jeopardize the -- and the requirements of the velocity of water is to prevent water -- and that's something that needs to be addressed.

And then regarding the kitchen piping, I think Steve mentioned that 120 to 140 degrees

water is what's required for dishwashers. And recently I did a survey of dishwashers and I thought that many of the dishwashers now have their own boosters. So that's something that needs to be checked. I don't think we need to supply high enough temperatures.

So basically 120 degree water should be adequate, and then the dishwasher boosts the temperature up.

And the last item from Steve, his question regarding single lever faucets. Perhaps there could be a safety issue there. Because if you were to have one dedicated faucet for hot water alone and one were to suddenly open it and if the water really is going to be hot and it's going to be available right away, it could have danger issues with small children.

And finally, regarding the prototypes and the disassociation of the budgets, I don't know whether that makes sense, because currently we are allowing tradeoffs between the different systems and different pieces of equipment. And we do not see why there should be a disassociation of the tradeoffs between water heating and the rest of the building, because that's not in the spirit

of Title 24.

And perhaps if we address the issues of the budgets, themselves, like reducing the budget and differentiating between the individual water heaters and central water heaters having separate budgets, perhaps this is going to go away.

And as we have heard earlier, there's also going to be a glazing issue that's going to be addressed.

So perhaps we don't need to disassociate the budgets for water heating versus the rest of the building.

And those are our comments.

MR. LEBER: Thank you, Ahmed. Michael.

MR. DAY: Michael Day, Beutler Industries. First off I'd like to echo Ahmed's comments here about disassociating the parts of Title 24. It's worked pretty well, allowing everything to work together and encouraging industry to come up with creative ideas to try and get the total amount of energy spent down. And we've done a pretty good job of that over the years.

Some specific comments. First off, with regards to central water heater systems versus

distributed water heater systems. We did a little look-back over the last two years. Less than 5 percent of the units that we were installing used either a heat pump or a centralized water heating system.

For us, that was about 9000 units of residential multifamily. So I think that there might be some assumptions going that while it might be less expensive initially simply for the water heater, when you add the fact that you need separate water heater systems to run hydronic heat, or you need to add in a more expensive heat pump or furnace units to the individual units to take care of the space heating needs.

The vast vast majority of what's being done in northern California, at least, are 40 gallon water heaters out on the patio deck. And hydronic heat. It's by far the massive majority here.

And lastly, just sort of as a philosophical question with regards to multifamily, there's a lot of question about urban sprawl; there's a lot of question about land use. The basic premise in multifamily is that you are going to get common walls.

So I think the terminology of loopholes and stuff that are trying to be used to disassociate multifamily from the remainder of the residential market is a little bit pejorative.

I think that the fact that these people are willing to put multiple people into a fairly small footprint and they get some benefits from the fact that they have conditioned spaces around these, if that works to their benefit, well, bully for them. Because we end up with a lot more societal benefits by not having 35 Rocklins spring up instead of having one apartment complex.

Thank you.

MR. ELEY: Can I just get a clarification of some of the numbers you gave?

MR. DAY: Sure.

MR. ELEY: You said of 9000 residential units, less than 5 percent of them, multifamily units, --

MR. DAY: Yes.

MR. ELEY: -- less than 5 percent use central water heating, you said --

MR. DAY: Less than 5 percent of the units that we did had central water heating systems. And that's critical to us because just

about everything is either an up-flow, wall-mount with hydronic heat and DX cool. Or a soffit mount DX cool hydronic heat.

So we're pretty intimately aware of what's going on on the water side, even though we don't do plumbing, ourselves. It ties into how the heating is done.

And there's either going to be a completely separate heating system for hydronic heat, or you're going to go with heat pumps. And between those two is less than 5 percent. The guess was, according to the guy who runs that department for us, he could only think of three projects. And it was less than 500 units out of approximately 9000.

MR. ELEY: So, are these combined hydronic systems that are the most common?

MR. DAY: Yes, absolutely.

MR. ELEY: So the water heater --

MR. DAY: You have two coils --

MR. ELEY: -- on the patio is used for space conditioning as well as water heating?

MR. DAY: Correct. And the code allows you to use the same water heater for both space water heating and for space heating.

And, at least in northern California, we don't do anything much south of Modesto or so, but in this area we're the 800 pound gorilla, and we know pretty much what's going on, and there's not a lot to the other side.

MR. ELEY: Thanks.

MR. LEBER: Lance.

MR. DeLAURA: I actually have an add-on. This is Lance DeLaura with Southern California Gas. In our service territory the numbers would be very similar to what you just heard.

The predominance is combo hydronic systems in multifamily units.

MR. ELEY: Okay.

MR. LEBER: Other questions.

MR. WILCOX: I had a question for Steve, about your proposals on plumbing measures. It seems to me that you're proposing changes that aren't part of the energy standards.

I mean you're proposing we change the rules on pipe sizing, which I don't believe is a Title 24 issue at this point.

And --

MR. GATES: Well, it is in the plumbing code but not in the energy standards.

MR. WILCOX: That's right, so are you proposing that as part of this process we ought to take on changes to the plumbing code or what do you think we should do?

MR. GATES: Yes. As I said the plumbing code, the fundamental assumption there is that you want to be able to draw a lot of hot water -- or a lot of water. And the plumbing code does not distinguish between whether it's hot water or cold water, per se, in terms of pipe sizing.

But that is the fundamental issue, is that the plumbing code assumes a draw rate from a fixture that is several times higher than what Title 24 allows. And so there's a fundamental incompatibility right now between Title 24 regulations in terms of how much water you can draw, versus what the pipes are sized to deliver.

Personally, I've cheated in the past on various houses I've owned by removing the flow restrictors from faucets so I could get the water out faster.

SPEAKER: I'm telling.

(Laughter.)

(Parties speaking simultaneously.)

MR. LEBER: That's the end of that; took

care of that commenter.

MR. GATES: But some of these issues are quite solve-able, you know, these are engineering calculations; they're not difficult to do. You can, you know, still assume -- you can even assume the same diversity factors that the plumbing code assumes, but just simply assume lower draws. And just by doing that you can result in a pipe size typically at least one pipe size smaller.

MR. LEBER: Frank.

MR. STANONIK: Frank Stanonik with GAMA. Just two quick points. On the issue of central water heating systems versus individual water heaters in multifamily dwellings, it seems to me I've seen two things, or seen one thing and heard other things.

I thought I read that the measure was to look at perhaps changing how much tradeoff could be done there, and yet I'm hearing comments say eliminate the tradeoff.

I would suggest eliminating ability to tradeoff may be going too far. You know, obviously there's various different circumstances and various reasons why people will pick one system over the other, but there is certainly some

segment of those multifamily buildings where in fact a central system is more energy efficient. It does save energy.

And I would caution you to not go so far that in fact you discourage people from, in those cases, picking the better system, the more efficient system, I'm sorry.

The other issue is on the residential water heaters and the blankets. There's still some debate on exactly when, but certainly by 2005 all residential gas water heaters are going to be designed and built so they will not ignite flammable vapors in the vicinity of the water heater.

Currently the approach and the design is probably going to be implemented is to use basically a flame arrester, which is a very finely engineered and precisionly cut slots, a series of slots at the bottom of the water heater.

The other part that comes with that is all the air that enters the combustion chamber is going to have to come through the flame arrester. And we certainly have a concern if you're going to continue to promote the use of blankets that there may be some circumstances where the blanket, in

fact, hampers the operation or clogs up the flame arrester.

And that was an issue that didn't exist 12 months ago. But by 2005 those will be the only kind of water heaters you can buy.

MR. LEBER: Nehemiah.

MR. STONE: Yeah, a couple things. First I'd like to address the issue of central versus individual water heaters.

The proposal we're making actually doesn't say that, you know, you're going to get a credit for doing one or the other. It basically says what you're going to do is what your budget is based on.

So, it takes away the credit. So, in a way, it's kind of academic whether the number of water heaters that ar central systems is 5 percent, 50 percent, 100 percent.

Now, having said that, we've looked at multifamily buildings in southern California over the last couple of years and we have found one new project that had individual water heaters. Every other project, and this is, you know, this is 15 or so projects, every other project had a central water heating system and delivered hot water to a

fan coil for heating, and delivered hot water for domestic use.

The other thing I wanted to mention was Dave Ware said make sure you don't make it too easy to tradeoff the HW energy savings. I think what we need to do is make sure that we get all of the analysis right.

It seems to me that we should all be able to agree that if everything gets the actual credit that it ought to get, in other words if we have what we got, we got everything right, it doesn't matter whether somebody puts R-19 in the ceiling because they've done something else to make the building better.

The end point here, according to the Warren Alquist Act, is to make sure that we have a performance standard where every building does not use -- is not wasteful in terms of energy at a certain point.

So I think, you know, it sounds like there's this train gathering speed to get rid of the ability to tradeoff, or limit it more and more and more.

I think we need to go the other way. We need to take a look at making sure we get all of

the calculations and assumptions and everything exactly right so that people can do whatever they want and you end up with an energy efficient building.

MR. LEBER: Lance.

MR. DeLAURA: Nehemiah, just to address one of your comments. SoCalGas tracks very carefully the number of combo systems. And I'm not sure if we're mixing terminology here for water heater only buildings versus combo system buildings.

We'd be happy to provide you with the statistics that we have. There is a very significant number of combo hydronic systems. It's actually the majority in our service area.

MR. STONE: Well, actually I'm not sure if we're talking past each other, because I'm not talking about whether it's a combo system or not. What I'm talking about is whether it's a central system or not.

A lot of these systems, they are combo systems. You have one water heater that serves hot water to the fan coils which provides the heat. It also serves hot water for domestic use.

MR. DeLAURA: But are you speaking of a

central system --

MR. STONE: Yes. Yes.

MR. DeLAURA: In our case that would not be true. In our case it is individual water heaters within the dwelling unit on a combo system with a fan coil.

MR. FERNSTROM: Gary Fernstrom, PG&E. Just to chime in on this discussion about how the market looks. We have a preponderance of individual water heaters that are multifamily dwellings, but on account of the venting difficulties with gas appliances, most of those water heaters are electric.

And that information comes from our residential appliance saturation data.

MR. DeLAURA: Again, I would reiterate, in our area that would be for gas, that those are combo systems, combo hydronic natural gas.

MR. LEBER: Other questions or comments?

MR. TRIMBERGER: Tom Trimberger with CALBO. A couple issues regarding water pipe sizing. I think that would be difficult to preempt the other code bodies as far as water pipe sizing.

It's obvious that oversizing does cause

some loss of hot water that gets halfway to the fixture and then left there.

The '97 UPC that's adopted to the '98 CPC that we use did make adjustments in the water sizing factors due to ultra low flush fixtures and reduced flow at lavatories and showers.

There is some concern in the plumbing code industry about scald capability, also. And they've talked about that strongly. They look at that as a water pipe sizing issue also, where, you know, someone flushes in one room and burns a person in the shower in the other room. It's the sizing. More than just a single handle lave or two-handle lave.

And even with the sizing pressure that we have, and the sizing that we do have right now, be it oversized, there is continued pressure -- little bit of pun -- pressure on water utilities to be able to keep up the demand and the pressure, as, you know, everything will be fine for the house, but then as the whole development gets built out, three years down the line they can't provide the 55 psi, and now it's 35. And the flow rates at the fixtures are being affected by that.

Also on the issue of water heater

blankets. I'm not sure what exactly, you know, I recognize, Charles, that we're looking to, you know, I guess have a higher baseline for water heater efficiency.

But I don't want to go back to, you know, putting water heater blankets on water heaters and voiding their warranties. I don't even want to provide incentive to do that.

I think we had concern about combustion air to water heaters, and let's just tread lightly there.

MR. PENNINGTON: The comment related to the blankets, my perception of this is that with the change with the national efficiency requirement, coupled with sticking with a requirement that says if you have a below .58 energy factor you have to have a water heater blanket.

And making that the basis of the standard, that the combination of all of that will reduce the number of water heater blankets that are installed on equipment, rather than increase them. Because there will be far less water heaters that are below the .58 where our threshold is.

So, it seems to me the sum total of that combination is a reduction in water heater blankets used.

MR. RAYMER: Bob Raymer with CBIA. This comment applies to, of course, water heating and a host of other issues that we discussed today and will be discussing.

The building code designates single family homes as being an R-3 classification, whereas R-1 applies to both condos and apartments. That's done largely for purposes of fire safety, and more recently the disabled accessibility requirements.

The problem for energy conservation comes in that a condominium, although it represents I would say roughly about 10 percent of the overall multifamily market, energy demand within a condo and the overall design of the for-sale unit, the condo, versus the rental apartment unit are going to be substantially different.

Case in point, I could easily see where a 1500 to 1600 square foot condominium might regularly have only two people living in it, whereas a 1500 square foot apartment could easily have six to eight individuals living in it.

And so there's a huge change in product use among here. Just food for thought as we go through all this.

MR. HOROWITZ: Can I ask a followup to that?

MR. LEBER: Sure.

MR. HOROWITZ: Are you implying then that we should have different sets of rules for apartments and condos then to deal with that difference?

MR. RAYMER: I think, as we head further into it and start talking about what changes will actually be made, yes.

MR. ELEY: Can you always tell that it's a condo or an apartment when you file for the building permit? I guess that's the question.

MR. RAYMER: Yeah, but first off, one of the things that helps make this, I don't want to say it's a minor issue, but reduces the overall impact of the state's conservation is that we're barely building any more condominiums anymore for a host of reasons.

Having said that, it is quite possible that one entity would enter into an arrangement of producing a series of condominiums, and then if

the market somehow goes belly up, they'll end up renting those units.

Right now that's not the case. But that's not to say that that couldn't change at a later date. And once they become rentals obviously there's a whole different market for that.

So, the best thing that we can do, though, let's face it, if you're designing something to be a for-sale unit, obviously you're going to be looking at more glass and a host of other things.

And so there's a -- it's an odd ball.

MR. PENNINGTON: One piece of information that I just wanted to add here to the discussion related to multifamily, particularly low income, is that during the AB-970 process, HCD became quite interested in the desirability of increasing the energy efficiency features of the housing that were subject to their program, so that those homes would be more affordable.

And so I think that we have a potential ally, actually in setting up reasonable energy efficiency requirements in the agency that has a strong responsibility for low income housing.

MR. RAYMER: Absolutely, and I think HCD is going to be a good partner in it. Unfortunately, yesterday afternoon -- of course, when you're building apartment construction you're always going to be very interested, and so is the bank going to be interested in the first cost of all this.

And, of course, with the occupants you're going to be very interested in that monthly utility bill.

Substantial sums of money that was earmarked to help some of these upfront costs for low and moderate income apartment units got whacked last night. I think $150- to $200 million was scratched out of the budget.

So a lot of the money that HCD was hopefully going to be working with may not be there.

MR. LEBER: Dave, did you have a --

MR. WARE: Yes, I just want to make a question and followup to Bill's comment -- the new NAECA water heating requirement will move a factor of 5 --

MR. ELEY: What's now -- a 50 gallon water heater now would be required to have a .525.

With the new requirements it would be required to have a .575. So everything just gets slided up five decimal points.

MR. PENNINGTON: And for a 40 gallon water heater it goes from --

MR. ELEY: Still goes up five decimal points.

MR. PENNINGTON: -- five decimals, so it's above the .58.

MR. ELEY: Close to .6.

MR. WARE: Well, and that's what I picked up from what you said.

MR. ELEY: Yeah, right.

MR. WARE: Current practice, what you can find out there is typically a .60 today. So, while indeed if the standards are based upon now 58, 59 water heater, we've closed that compliance gap that's a giveaway already.

I mean you close it automatically with the fact that the new NAECA standard gets entrained in the base budget. But the reality is the water heaters that will be on the market and available to builders is still higher than that, and that was my point.

MR. ELEY: Right.

MR. WARE: We're going to close the gap through the NAECA, but we're not closing it as much as, you know, it really needs to be.

MR. PENNINGTON: Exactly. The 40 gallon water heaters we found .62 energy factor to be readily available at essentially no cost. And a .60 energy factor for 50 gallons, same thing.

MR. WARE: We need to think about how we're going --

MR. LEBER: Nehemiah, you had your hand up awhile ago.

MR. STONE: Yeah. Just a quick comment first about something Charles said about the demographics of the -- that with Jim's program we can figure out what the water use ought to be for different demographics, but we probably don't want to include that in the standards because we don't know.

There is a case where we do know, and I would recommend that we keep that in mind. That's for seniors housing. Because housing that is built for senior housing is going into areas where that is pretty much all you can do, and they have that funding. And so we don't have to worry about some day later it gets changed.

Also, to address your issue, Bob, about the additional cost to make these affordable units more affordable in terms of energy also, what we're finding is that actually you can easily get 20 percent better than the standards at no additional cost. I mean at zero additional cost for multifamily.

You have to sit down and think about it for awhile to figure out how to build a building, a multifamily building, that just met code. I mean it's really difficult. It's not the same thing as you experience with subdivisions.

MR. RAYMER: Do you think that's a factor of the glass situation?

MR. STONE: It's the glass and it's the water heating, both. Those two things put together make a huge difference. So if we just fix those two things without doing anything else, we've already, we've eliminated the ability to trade away a bunch of things that are proven to be cost effective.

And so we increase the efficiency, maybe not the -- maybe we won't pick up the whole 25 percent, but we increase it without adding any costs really. I mean there will be a little bit

of cost, the R-19 to R-30, you know, they would trade away the R-30 back down to R-19.

But that's, you know, when you're talking about the fact that, you know, multifamily doesn't have a roof over -- I mean doesn't have a ceiling, an insulated ceiling over every unit, that's not -- that's a very small cost to make that additional change.

And I'd like to reiterate a little bit what Bill Pennington said about HCD. They put out, just before the new director took over they put out a report about housing out to 2020 in California. And you read through that report and energy is mentioned two or three times, period. Energy efficiency is never mentioned.

I mean when they were thinking about affordability they were thinking first cost only, and they were adding up all of these individual things and coming out saying, well, jeez, we can't add anything to the cost of these buildings. And not even make them -- they make them so that they don't have as high a cooling budget. I mean nothing.

Now, with the new director, they've come 180 degrees. And now they realize, especially

after the energy crunch that we've had over the last two years, that affordable upfront is not the whole picture. If you can't afford --

MR. RAYMER: I wasn't suggesting that it was. You should understand that in multifamily construction, particularly apartments, it's a very key point as to whether the bank will or will not loan you the sum of money to get the project off the ground.

Right now we have a situation where the State Fire Marshal Office wants to impose a sprinkler standard two years early than what would normally happen at the national level. That will be an additional $1500 extra charge, hard costs and labor. And that alone, there's serious evidence to show that that will actually kill some of the current projects.

I would imagine that over the long haul they will be able to absorb this; be able to show that yes, these units are just as rentable as always. But you have to convince your lending institution or institutions that the product will be profitable over the long haul in terms of the rent. So in addition they have to be able to bump that original loan rate up.

If you're looking at a very low cost product, it can create problems.

MR. STONE: One quick response. I'll make it very short. We actually worked with a number of developers on that issue. And the fact is that what the banks are concerned about, the lenders are concerned about, is what their pro forma looks like. What's the monthly income stream going to look like.

And when they're providing hot water, or they're providing anything that uses energy, we can show them how to reduce those energy costs. And we can work with them to get everything, the whole system, the building as a system, functioning more energy efficiently.

MR. LEBER: It's not been short enough, I think.

(Laughter.)

MR. STONE: Then they have a better chance of getting the loan.

MR. LEBER: Ken.

MR. NITTLER: It occurs to me one other issue that is awkward in our water heating stuff, as long as we're talking about fixing things, as homes get larger there's a breakpoint say around

3000 square feet where builders often feel compelled to either look at doing two water heaters or move to a large storage gas water heater.

When you make that jump, when you're on the smaller units you can find these higher energy factor units quite readily, and you know, they're wonderful compliance option. But when you make the jump to the large storage water heaters there's no real equivalent. And in fact you change ratings, the energy factor is no longer the rating.

So we should probably look at that issue and figure out a better way to handle it, if there is one.

MR. LEBER: Other comments? Ahmed.

MR. AHMED: A.Y. Ahmed, consultant to The Gas Company. A final comment. This water heater issue is a really sticky issue for us, so we need to really do our homework before we propose anything, I suggest.

And I think we have heard a lot of talk about that glazing and water heating budgets are being used to sort of dilute the standards. Why don't we get some proof of that and see some

submittals of multifamily buildings, the recent submittals, and see what is really happening.

Are the mandatory features being really traded out. Or features like insulation and equipment efficiencies for air conditioners and furnaces are being really traded out because of these loopholes.

And then number two, we need to find out what percentage of this trading off is attributable to glazing versus individual water heaters versus central water heaters, so that we at least know the whole story.

We've been hearing a lot of numbers, I mean a lot of discussions, but we don't have any numbers to really take a look at. We'd like to see that.

MR. ELEY: Well, that last part's going to be pretty impossible to determine without going out and interviewing all of the owners.

But, Nehemiah, I think you've got some data on --

MR. LEBER: Well, there's some data on both of those issues. We have a report that's on our website and I think we announced it in the October workshop, that has some of the data on

what kinds of measures are being used for compliance, which can give you a flavor of what's going on there.

And then there's also what Nehemiah has been working on. And so I mean the data is getting to be more thoroughly on the table.

We've also had some reports from a variety of people who do compliance work that kind of popped up with the same kinds of things.

So, I mean some of that data is there. You're right, we need to have it. And, you know, it's getting put on the record.

Are we ready to move on to the next item here? We're five minutes earlier than we absolutely have to be to stay on schedule, I guess, but -- oh, Pat.

MR. EILERT: Yeah, Pat Eilert here from PG&E. I just wanted to let everyone know that we put RFP on the street just recently to do a study on multifamily. And, you know, some of the results of that will be available, you know, second quarter.

SPEAKER: Is that northern California only, or is it statewide?

MR. EILERT: Statewide.

MR. LEBER: So, the next item is lighting. Do we have Mr. Daniel with us?

MR. ELEY: He's not here, but I will cover for him.

MR. LEBER: Okay, thanks, Charles.

MR. ELEY: The lighting slide, please. There's several changes or suggestions being proposed. The first one is really kind of to simplify things. We'd like to provide a definition of high efficacy lighting once in the definition section so that in other places it's standard. You can simply say use high efficacy lighting in this application.

And the definition that we're suggesting is 55 initial lumens per watt for small lamps, 40 watts or less. And 65 initial lumens per watt for larger lamps, 41 watts or more.

We're suggesting that only lamp watts and initial lumens be included in this for simplicity, because this data is readily available. As soon as you get into maintained lumens or accounting for the effect of the ballast and everything like that, it gets really complicated. So if we keep it in terms of the lamp watts only and initial lumens it's a lot

easier.

And then we also need to say that a high efficacy luminaire can't contain a medium base incandescent socket. In other words, you can't meet the requirement by putting in a screw-in compact fluorescent.

Next slide, please. Kitchens have been a big source of confusion, and I think mainly what we want to do is clarify it here. And there was a whole issue of a blueprint, I believe it's spring 2000 dedicated to kitchens and bathroom lighting.

And we want to just take, insofar as that clarified things we'd like to take some of that language and get it into the standard.

So, one simple -- the biggest confusion is that the standard says general lighting has to be high efficacy, but task lighting doesn't. And it's really muddy sometimes about figuring out what's general lighting versus task lighting.

So there's a couple of options. One is to just require that half of the lamp watts be high efficacy. Simple. The other is to clarify general lighting using the language in the spring 2000 bullet blueprint. So those are the two options that we're looking at.

Next slide, please. The next change would simply require high efficacy sources in certain spaces like laundry rooms, utility rooms, garages, basement utility areas and shops and so forth.

This would, in effect, right now there's a link between this and the bathroom lighting requirement that would go away because this requirement would just simply require high efficacy sources in these applications.

Next slide, please. And in bathrooms we want to clarify this requirement, and simply say that if the room has a water closet, a sink or a tub or a shower in it, then it has to have a high efficacy source.

And if there's more than one luminaire in that room the high efficacy luminaire has to be switched at the door.

Next slide, please. Then for hotel/motel guestrooms, I guess that falls in low rise residential here, could be high rise, as well. So this one's kind of on the border between today and tomorrow I guess.

But this would require high efficacy luminaires in hotel/motel guest rooms. And the

exception would be up to 10 percent of the guestrooms need not comply, or up to 10 percent of the luminaires in the building need not comply. The 10 percent exception is to cut a deal with, you know, hospitality suites and special rooms that the hotels have a need for.

Next slide, please. Now, this is new here. This begins to get at an issue that some have raised as a problem, which is recessed luminaires in insulated ceilings.

So the basic requirement is that recessed luminaires shall meet two requirements. They shall have an ICAT or insulated ceiling air tight housing. This is the housing that the luminaire goes into. This enables it to -- insulation to be blown directly on top of it, plus it's air tight, so infiltration is reduced.

And if it's not a high efficacy source, then it has to be a small diameter luminaire. And 5 inches or less. And rated at no more than 75 watts. So, in essence, what this is going to do, it's going to require that these recessed luminaires either be compact fluorescents or some type of high efficacy source. Or they've got to be rated at less than 75 watts. And the 75 watt

limit is basically going to push you towards low voltage, MR-16s, or other types of low voltage. Or R-36's, maybe.

And then there's some exceptions for luminaires that are not in direct -- that are not in contact with insulation, or not required by the NEC to be type IC fixtures.

Next slide, please. Exterior lighting. And this is the last one. This would simply require that exterior lighting in residence use high efficacy sources. And there's a few exceptions.

There would be an exception for climate zones 14 and 16 because compact fluorescents are not going to start on cold days in those climates, so you can't require them there.

And then there's also an exception for luminaires that are 50 watts or less. The idea here is probably the little, you know, the little mushroom shaped ground lighting that bring you in along the patio or those kinds of things.

Or, if the luminaire is controlled by a motion sensing device, so it's only on when you approach the door, or when you walk about. Then it doesn't have to be high efficacy.

And then the last one is really a safety issue. This is lighting used around swimming pools or water features where there's an exception there.

So, that's it.

MR. LEBER: PG&E.

MR. MAHONE: Okay, Doug Mahone, Heschong Mahone Group for PG&E.

We actually find ourselves in violent agreement with the proposals that Charles just put forth.

(Laughter.)

MR. MAHONE: We are basically looking at the hardwired lighting in residences. We have basically included virtually all the same things that Charles has mentioned.

A couple of other items that are on our plate to consider. Charles talked about the garages and utilities and how there's currently tradeoffs. We're also interested in seeing that tradeoff eliminated.

We are considering the possibility of instead of specifying, for example, half of the watts in a particular space be high efficacy sources, given the market penetration and

increasing availability and rapidly dropping costs of compact fluorescent fixtures, we're going to actually look at the feasibility of simply saying any hardwired lighting fixture in the home be a high efficacy source, probably with exceptions for closets or places where there's very few hours of operation.

But, either require that all hardwire lighting be a high efficacy source or if they want to use low efficacy sources that they be automatically controlled, either with an interval timer or an occupancy sensing device.

We also want to clarify the space definitions, get rid of some of the confusion and opportunity for gaming, the definitions for various bathroom facilities to just simplify it. If there's a plumbing fixture there, it's a bathroom.

And also are interested in doing the same kind of simplification of switch location requirements.

MR. LEBER: The long pause means you're done?

MR. MAHONE: Oh, I'm sorry. Over and out.

(Laughter.)

MR. LEBER: Gary.

MR. FERNSTROM: Gary Fernstrom, PG&E. I was waiting to see whether you were going to go on to comments.

MR. MAHONE: I think Noah's up next.

MR. HOROWITZ: NRDC is next.

MR. LEBER: Right, Noah.

MR. FERNSTROM: Well, I have a comment but I want to wait until everybody's done, so go ahead.

MR. LEBER: Okay. No, NRDC needs to go first.

MR. HOROWITZ: Okay. Basically ditto. I don't have formal comments, but basically the goals we were looking at and rewriting for the update of the code you've addressed virtually all of them, which we're pleased to see.

Our goals were to reduce the number of inefficient cans that are predominating in new construction. We wanted to see the exterior lighting, in particular the porch lights which are often on 10-plus hours a day, and seldom have CFLs in them, or motion detectors. You caught that one.

We wanted to see the definition of a bathroom expanded. And I think you've come up with a good way to do that, so we don't have to argue on what a bathroom is, which isn't that productive, in my opinion.

(Laughter.)

MR. HOROWITZ: In terms of the kitchens right now what we're seeing is there's one cheap CFL can and that satisfies the code. And there will be 15 other cans up there, and we need to get around that. And I think we're part of the way there.

I concur with Doug in terms of the status. There's a wide range of energy efficient hardwired and base fixtures that are out there. With the one exception of good recessed cans. I think were one-plus years away from getting the 10 base CFL can. And I don't know if this proceeding will allow it to see how far and how available those are. But I think there's some things we can do even without that.

In terms of responding to your proposals, I think the exterior lighting, you've got it, bulls-eye.

In terms of the kitchens I need to study

this further. You're proposing, as I understand it, 50 percent of the watts need to be high efficacy. And that's clearly a huge step in the right direction.

I'm wondering if x percent of the sockets is a better way to do it. Those being high efficacy so you don't have to add up all the watts, and it might be a little simpler, I'm not sure.

Also we're still probably going to have some cans that are screw-based. I'm wondering, although you can play hide the CFL, if we require there be an EnergyStar screw-base CFL contained at the time of sale. Obviously those can move around, just like the window shades did. But it's at least a feel good.

Utility and laundry spaces. I like what you've done there.

The bathroom expansion is good. We're only going to get one of the fixtures, and often there are still several fixtures in the bathroom. In particular, the Hollywood bars where you have four or five incandescents. You can probably still do that if you have an efficient overhead light. So maybe as Doug suggested, in the

bathroom we have a control. So if someone leaves the room with the light on, at least we catch it that way. And that's a simple way to still allow the choices.

One application I'd like to point out, I'm not sure where it's touched in the regs, and this could be a Title 20 issue, also, are ceiling fans.

In many new homes often each bedroom has a ceiling fan. and often they attach light kits to those. So, are those lights or are those fans? I would advocate those are lights, and we should require those be high efficacy to define them.

In terms of the hotels, the bathroom is often used as a night light, and sometimes -- so the control there would make sense, as well. And often in hotels people have the mindset it's not my house, I don't have to turn the lights off when leave. So additional thought beyond the bathroom of controls would make sense.

And that concludes my thoughts.

MR. LEBER: Thank you, Noah. Questions or comments? Gary.

MR. FERNSTROM: I have a comment about Charles' definition of high efficiency fixtures.

I think the lighting proposals being made are excellent. However, I don't think for the sake of simplicity using initial lumens is satisfactory to accomplish our energy efficiency goals.

And to make this point I'll relate a story that was provided me by Noah's predecessor, Chris Caldwell of the NRDC. About a decade ago NRDC was encouraging PG&E to develop some programs to increase the market penetration of compact fluorescent lamps.

And back then the General Electric Company produced this circline lamp with a magnetic ballast that I learned was being provided low income customers in some of our programs.

Well, it turns out that those lamps with magnetic ballasts have only about half the efficacy of similar lamps with electronic ballasts. So instead of 15 lumens per watt incandescent, you're looking at maybe 30 with a magnetic ballast. And probably a system efficacy of 60 with an electronic ballast.

We see this with T8s and electronic ballasts, that's why virtually all commercial lighting is T8s and electronic ballasts now.

So I'd suggest to you that in order to

avoid getting fixtures that have high efficacy lamps, but poor magnetic ballasts, we double our opportunity and specify system efficacy where we would be requiring electronic ballasts for these fixtures.

MR. LEBER: Yes, Mazi.

MR. SHIRAKH: Gary, you didn't see the entire proposal. What Jim Benya did, he actually came up with a matrix that was pulled out of the advanced lighting guidelines. That used the efficacy of the lamps that was presented the last round of the advanced lighting guidelines, which was quite energy efficient compared to what we have in there.

We talked about this idea of energy ballasts -- I mean electronic ballasts. And there is a federal rule that's going to go into effect in 2005 that's going to require electronic ballasts. At least we know in the linear four-foot fluorescents. We need to investigate to see if that applies to compact fluorescents. And if it does, I think that will take care of your concern, too.

MR. FERNSTROM: That would be great, but I think that federal mandate for electronic

ballast doesn't apply to these crummy little ballasts that you find in residential cam lights and other types of fixtures.

MR. LEBER: Other comments, questions? Ahmed.

MR. AHMED: I just have a quick question for Charles. On this down light you listed at 75 watts or less, isn't there 31 -- I mean 61 --

MR. ELEY: What's the question?

MR. AHMED: Your slide said that you --

MR. ELEY: 75 watts.

MR. AHMED: Less than 75, but I thought there is a 60 watt incandescent fixture that'll fit.

MR. ELEY: Well, if it's a standard line -- candescent, it will be typically rated at 150 watts at least. So, those would -- so by limiting it to 75 watts, you're essentially requiring an incandescent luminaire that actually has a ballast in it.

Once the ballast is there you're pretty confident of what the lamp watts will be. It will either be an MR-16 or a par 36, or par 30.

MR. LEBER: Dave.

MR. WARE: Dave Ware, Owens Corning and

NAIMA. Charles, your proposal for hotel/motel, the efficacy, again an exception of 10 percent of the number of rooms, guestrooms --

MR. ELEY: It's actually -- it's not well written. It would be an exception of 10 percent of the luminaires in the building, or the watts in the building.

MR. WARE: Oh, 10 percent of the luminaires?

MR. ELEY: Yeah.

MR. WARE: Okay. All right. I thought you were talking about limiting 10 percent of the guestrooms, which could be sizeable amount of guestrooms --

MR. ELEY: Yeah, but it's sort of intended to deal with the special guestrooms that are set up as hospitality suites and that sort of thing, where you need dimming and certain accent lighting.

MR. LEBER: Noah.

MR. HOROWITZ: I want to build on the comment Gary Fernstrom made. You can have efficient lighting that performs poorly in terms of startup time, flicker, noise. And the EnergyStar label has done a good job at not only

setting efficacy requirements, but handling all those other things.

And I know the Commission in general is hesitant to simply say you must be EnergyStar, although that makes verification easy. I wonder if there's some way to either consider saying you must be an EnergyStar labeled fixture, or at a minimum extract part of the important parts of the EnergyStar spec without making this too complex.

MR. ELEY: If I could make a comment just briefly. I think Jim Benya and I both would like to use system efficacy. It's just -- it's kind of a balance between that and the enforceability of the requirement.

I mean I don't think in residences that HID sources are going to be widely used indoors, but they have -- their lamp lumens drop off quite considerably after initially. And you know, if you just look at initial lumens they're great, but if you look at them a few months later they're not so great.

So I think we would all like to go to system lumens; it's just a matter of simplicity, enforceability, getting something the building officials can verify in the field.

MR. FERNSTROM: Okay, so I understand the tradeoff. Maybe a good compromise would be to similarly mandate fixtures with electronic ballasts.

MR. ELEY: Yeah, okay.

MR. LEBER: Other comments? Noah's didn't get addressed.

MR. HOROWITZ: Relative to considering adopting EnergyStar as the requirement.

MR. ELEY: Define high -- EnergyStar as a high efficacy source.

MR. PENNINGTON: Well, the reason why the Commission has not wanted to do that in the past is because EnergyStar specifications are subject to change, you know. If you said as of a certain date, and the EnergyStar specification changed, then the label for the changed thing wouldn't have anything to do with your date specification.

I think the idea of maybe incorporating part of the EnergyStar spec into the regulation is a more viable way to do it. Maybe the industry would discover that an EnergyStar labeled product satisfies the requirement and that's an easy way for them to do their requirement without having to

have the regulation refer to something that we don't have control over.

MR. HOROWITZ: I think if you extract the important parts from EnergyStar you're doing the same thing. In terms of EnergyStar being a moving target I think that works in your favor. It's not going to get weaker, it's just going to get stronger.

MR. LEBER: Nehemiah.

MR. STONE: I just wanted to point out that that's exactly what the Commission did this last round for exit signs, what's in the draft standards, which will be -- appliance standards, which will be addressed in January is the EnergyStar criteria for exit signs.

MR. MAHONE: I'd actually like to reinforce what Noah is saying. There's a huge virtue in simply adopting EnergyStar because there's a label on there. And I think you gain more enforceability and in general compliance by hanging your hat on the fact that there are labeled products out there in the market that are easy for suppliers, installers, consumers and everybody else to recognize.

MR. LEBER: I don't know how much time

we really want to spend on that. I mean we have the idea, and we had the idea on the table.

Severe issue is that is not a date-specific sort of thing. EnergyStar is not date-specific. Consequently we have the dilemma that if we simply refer to it, and the standard changes, if EnergyStar changes without there being a public process, where the public can either object or not object to that specific change.

And so it really is something that I think we cannot do.

Now, we can look at the specific details of it, and we could integrate those details into our requirements. But to simply do it by reference is something that I think we simply cannot do.

MR. SHIRAKH: I think if we just required electronic ballast we're okay.

MR. LEBER: Now, if EnergyStar should change its labeling to have something that was a very date-specific, then I think there are some options.

But I don't want to beat that one to death. John, did you have --

MR. McHUGH: Yeah, I just was going to

say that --

MR. LEBER: You need to come to a mike if you're going to say something.

MR. McHUGH: Okay, sorry. John McHugh, HMG. Just related to that you could still have the process if you incorporate the particular technical requirements that are in EnergyStar, and then in the actual manual you could refer that EnergyStar complies with this, or, you know, is of equal or better performance than what's required.

Kind of deals with the issues of, you know, recognition and marketing of the EnergyStar and yet maintaining the standards as being something that's defined in just technical terms.

Thank you.

MR. LEBER: Thank you. Other comments? Are we ready to move to the next item? Well, it's other. Starting with alterations, Bruce.

MR. WILCOX: First slide, please. Well, the proposal here is to expand the requirements of Title 24 to cover more elements of the building that are changed in replacements and alteration processes.

One of the examples is if someone replaced their windows they might be required to

meet a standard for U factor and solar heat gain coefficient, just like you are for new buildings.

There are a number of other areas where it might be reasonable and cost effective to require upgrades such as if you opened up the walls in your building as part of an alteration that you would be required to insulate the cavities that were opened.

Or if you modified the HVAC system you might have to seal the duct work. And so forth.

So there are a number of areas where it's possible that we could show that it was cost effective to require minimum efficiency requirements for existing buildings that triggered as part of an alteration to the building.

I'm sure there are many other important points in that slide that I --

(Laughter.)

MR. LEBER: What happened to the slide? It died.

MR. WILCOX: And I understand from Dave Ware that we now have -- there's now a state law that directs the Commission to look into this -- 1574 --

MR. PENNINGTON: Now, let's be careful.

MR. WILCOX: All right, Dave, you shouldn't have told me. I should always be careful.

MR. LEBER: PG&E.

MR. MAHONE: Yeah, Ken Nittler is going to talk to this subject for us.

MR. NITTLER: PG&E is also going to be examining many of the same issues that Bruce was talking about. This is fairly compatible activity with what Owens Corning and Cardinal and others have talked about in terms of looking at features that could be upgraded upon time of replacement.

A couple areas that we're talking about especially is the issue of duct work being upgraded or sealed at the time that there's an HVAC replacement. And also the issue of replacement windows. And making sure that at the time the window's replaced, it's replaced with an energy efficient window.

We'll also be looking at how this might interact with mandatory measures or prescriptive packages, or even perhaps some of the performance standards to make sure that the building industry and the remodeling industry has flexibility when they encounter these requirements.

MR. LEBER: You're finished? So, next is Mr. Ware.

MR. WARE: I think all four of us that are on the alterations section here have really the same thing. There's enormous gains to be made by taking a look at the alterations requirements.

That's not my slide, but I'll use it.

(Laughter.)

MR. WARE: I think that we need to modify the section 152(b)(1) and at least delete the section that allows only the mandatory measures to be used to show compliance with the section requirements for alterations.

Alternatively I think we can build a table similar to what Ken was saying or suggesting that would capture some of the lost energy opportunities that currently are happening in the existing -- replacement if there is an alteration.

And there are extreme benefits from this besides just the statewide energy savings, and the reduced savings to the household. One of those is indeed it may indeed help the Commission meet its AB-1574 mandate. I'm sure there's, you know, it's possible the Commission hasn't really figured out how to do that yet, or what it means in the way of

the kind of information.

But for those who aren't aware, the Governor signed into law AB-1574 that mandates the Energy Commission develop specific energy efficiency guidelines for -- residential buildings. And also ties the point of sale home inspection process into that.

So there is some good synergy here between the Commission requirements for alterations and actually meeting some of the concepts that are put forward under AB-1574.

Also this concept here is consistent with the recent CPUC decision to encourage energy efficiency upgrades in existing buildings far beyond what they currently are, get some better saturation into the marketplace than the current programs have.

So that's pretty much my --

MR. PENNINGTON: Should I reply to your 1574 thing, or do you want me to wait until the comment period?

MR. LEBER: Wait for the comment period.

(Laughter.)

MR. LEBER: Bill Mattinson.

MR. MATTINSON: The Cardinal Glass

slides, Les, a couple, please. Well, like Dave said, we're all on the same bandwagon. Cardinal suggests that there are some very huge areas where improvements and vast savings could be achieved.

The first one has to do with replacement fenestration. Under the current standards replacement windows are exempted from the alteration language.

If you are, for those who weren't totally aware, an alteration to the windows means you're adding a square foot of window or adding a new window, adding a larger window or a new window, that must meet the current standards.

But if you're just replacing the same window, even if you're taking out the whole window and replacing it, there's no standard. Cardinal thinks that's stupid.

If you're going to put in a new window it should be a good window. Whether it replaces a bad window or adds another window is irrelevant. A bad window is a bad window. A good one is the right thing to do.

So, remove the exemption for replacements in the language for alterations. It's an enormous opportunity for savings. And the

suggestion would be to just go along with what we're setting for the prescriptive packages now for the appropriate climate zones.

The second one is this sort of warm and fuzzy area that Ken mentioned. How can we do something to existing homes that don't fit into the things we've been doing already. And obviously there are times and places where it's appropriate to make energy efficient improvements, whether it's point of sale, whether it's point of installation of new HVAC system. Don't know, but certainly Cardinal believes that fenestration deserves consideration at that point, too.

MR. LEBER: So at this point we move on to residential computer modeling. It's back to you, Bruce.

MR. WILCOX: I actually covered this earlier when we talked about the other computer modeling issues, so I don't think we need to talk about it again.

MR. LEBER: Don't need to go through that again.

MR. WILCOX: Unless anyone has any questions or anything, we can answer the questions, but --

MR. ELEY: Well, again, -- under HVAC --
MR. LEBER: Okay.
MR. RAYMER: Okay, on the computer modeling, we're not just talking about alterations, we're talking about the whole --
MR. ELEY: It's just having a better model for slabs and basements.
MR. RAYMER: Okay. My getting back to TDVs and what-not, if I heard correctly there'll be some type of a supplementary tool that we can utilize available in two to three weeks?
MR. MAHONE: Actually there's a supplemental tool on the website right now.
SPEAKER: For nonresidential.
MR. MAHONE: Residential?
MR. WILCOX: It'll be there.
MR. MAHONE: Oh, yeah, the residential ones still haven't -- tomorrow?
MR. WILCOX: There's a spreadsheet implementation that is intended to be a test kind of thing. And it's not quite as edifying and wonderful as normal MICROPAS.
One of the things that Ken recently offered to do was implement it directly in the program, going beyond that. That's the thing

that's going to be two or three weeks.

MR. RAYMER: Okay, hypothetical --

MR. WILCOX: One or two weeks.

MR. RAYMER: -- yeah, one of the things that we wanted --

(Parties speaking simultaneously.)

MR. RAYMER: -- we wanted to take some of the analysis that we were doing right at the end of the AB-970 and kind of take whatever this is and put it together and see the bottomline impact, just initially.

And so that is probably three, four weeks or so.

MR. LEBER: Steve.

MR. GATES: Yeah, Steve Gates with Hirsch and Associates. I wanted to just spend a couple minutes talking about the existing computer programs that are available for use on both the nonresidential as well as the residential side.

Currently CALRES and MICROPAS are the programs used predominately for residential compliance. CALRES is used for research and MICROPAS and CALRES are used for compliance, is that right? Okay.

The exception there is multifamily

dwellings four stories and larger, in which case that falls into the nonresidential category. And DOE2 is used for that.

DOE2 is also used for all other nonresidential applications, office buildings, hospitals, hotels and motels and multifamily buildings of at least four stories.

Now, so there's a real overlap here in the sense that very small single story motels are considered nonresidential, which much larger four story multifamily dwellings are considered residential.

So, there's a discontinuity here in terms of programs. And I just wanted to raise the issue that it is possible to use DOE2 for a lot of the residential as well as the nonresidential.

When DOE2 was first written the authors recognized that a building envelope does not use energy until you try to condition that space that it encloses. And DOE2 was written with that fundamental premise in mind.

DOE2 is a huge program. If you were to look at the current generation of the program easily two-thirds to three-quarters of the code in the program focus on mechanical systems in the

buildings, because it's the mechanical systems that use the energy. Clearly those systems respond to the envelope, and the envelope has an impact on energy. But it is the mechanical systems, themselves, that are using the energy.

As a result of that -- next slide, please -- DOE2 has a huge number of features that have been in the program for basically decades. Other algorithms implemented relatively recently. It's always been an hourly simulation of all the most common HVAC systems, including both temperature effects on system efficiency, part-load effects, latent cooling effects.

It can model a wide variety of residential systems such s heat pumps, two-speed, variable speed, ground source heat pumps, gas engine heat pumps. The program already has the capability of modeling piping losses and duct losses. These losses are not simple efficiency corrections to the equipment, but they're actually based on UA products of the components, loss through those components as well as temperature differentials.

The program already models domestic water heating including standby tank losses. It

does very detailed shading calculations of eaves, fins, overhangs, buildings adjacent to the building, even the seasonal type shading effects such as trees can be modeled.

The program has had extensive component libraries for years having to do with materials and envelope constructions. Those libraries were expanded in the most recent version to include hundreds of different glass types.

The current program also has the capability to now accept libraries virtually unlimited in size for HVAC equipment. So in the future it would actually be possible to directly specify makes and models of equipment; have the program automatically pull those out of the library.

Recently we added the capability to simulate photovoltaic systems. The program has always done central hot and chilled water plants. The program is capable of simulating a huge variety of rate schedules, all of the rate schedules in California, as well as most of the rate schedules across the country. And those capabilities are easily expandable to TDV calculations.

Next slide, please. The program also has quite a few -- interfaces, both written by ourselves as well as other vendors. So these interfaces are available from multiple sources.

The source code is also available to anybody who wants it.

And currently we are about to release a version with a new rules based compliance processor. This processor is available in both the eQUEST version of the program, as well as in a stand-alone version for use by other program vendors. This rules based processor basically allows you to create a file of rules having to do with compliance such as the file for Title 24, the file for ASHRAE standards.

We're currently in the process of writing a set of rules for the Government of Spain for their energy compliance calculations.

So this compliance processor can basically take a building as you've designed it and automatically generate a basecase version of that same model based on whatever specific set of rules that are applicable. And then do the two runs and present results.

So, basically I just wanted to raise

this issue and make people in the workshop aware that there is this program that already has more capabilities for simulating residential systems than any of the existing residential compliance programs that the Commission is currently using.

And our recommendation is that you consider using DOE2 for residential Title 24 research. And also consider making it the reference program for the ACM.

Thank you.

MR. LEBER: Thank you, Steve. Representative of ATI Architects.

MR. TURLEY: Hi, I'm Bob Turley, representing ATI Architects and Engineers. And we were commissioned by Web Services Company to look at the gas versus electric drying for in-unit clothes dryers.

Essentially what we found is something that bears serious consideration; it's simple, cost effective, and is something that has several benefits.

And so to summarize our recommendation it's that in multifamily housing where both new developments and existing developments that are undergoing alterations similar to the other

comments that are being made today about the codes and standards applying to retrofits, that where there are in-laundry unit hookups being provided that gas hookups be required where there is gas piping available for other uses at the time.

And this is for multifamily housing that we're proposing this recommendation. Applies to apartments and condominiums. And typically, as most of you know, a lot of the existing apartments and condominiums have central gas fired common laundry facilities.

And where provided in several -- I mean not in very many, but typically where there are provided in-unit hookups in apartments and condominiums they are typically provided electric only.

And so essentially what you have is when you are going to go in-unit, you have gas fired units at very low loads being replaced by in-unit electric driven units, where in apartment units they typically do use a larger load, mainly due to a lot of partial loads are done compared to common laundry facilities.

So if the state were to look at just maximizing energy alone, you would totally

restrict in-unit laundry facilities, but that's not what we're proposing here.

We're only proposing that where provided in-unit hookups for clothes dryers be gas in addition to or in lieu of electric.

This is similar to other state approaches that favor gas versus -- or electric versus gas. And it has some significant benefits, as well.

Next slide, please. As you can see by the graph we took a preliminary look at this, and the energy savings, you know, alone is over 100 billion Btus per year and escalates due to housing escalation.

This is comparing the consumption of the proposed case of gas dryer with the amount of natural gas that is required to be burned to generate the electricity for the electric clothes dryer. So when you're comparing those two cases that's how much natural gas we have calculated you would save.

From a demand standpoint the Commission has stated in the past that 2 percent of the current onpeak demand is due to clothes drying. And so of that, here's a significant amount of

demand savings that addresses the upcoming importance of time dependent valuation that the Commission's looking at. And we estimate greater than 10 megawatts per year.

This measure is very low cost in each unit, roughly $200 a unit. That can vary, obviously, due to site constraints and issues. And therefore, very cost effective. We estimate about a four-year payback on the data assumptions that we had.

So, overall summary, we feel because of the reduction in energy natural gas consumption yields environmental -- it's environmentally friendly, less greenhouse gas emissions, very simple, cost effective and something that we recommend.

MR. LEBER: Thank you. PG&E.

MR. NITTLER: Ken Nittler representing PG&E on this one. One of the other activities that PG&E's going to look at is sort of a comprehensive review of our implementation materials.

So this includes things like the residential manual, the forms, how it interacts with ACMs and software. And activities related to

making the standards more enforceable.

I think the concept would be to deliver some sort of paper or review that could be sort of used as a blueprint to make revisions that might be improve -- the standards.

Seems like I think all of us here know that the standards have many aspects to them. Some of them are complicated, some of them are not. But there's always a tremendous potential to actually achieve more energy savings if we can get higher levels of enforcement than we currently have.

MR. LEBER: We're to questions. Well, Mr. Pennington seemed to have some issue he wanted to address, and so I think --

MR. PENNINGTON: I just wanted to clarify the legislation that's passed related to existing buildings.

There's two bills that have affected what the Energy Commission's authority is. One is AB-549, and the other is AB-1574.

1574 provides general authority to the Commission to develop consumer information about existing buildings. And there isn't a responsibility associated with that, but there is

an authority to do that.

AB-549, among other things, requires the Energy Commission to complete a study that's due to the Legislature by January 1st of 2004 that would investigate the potential ways of improving the efficiency in existing residential and nonresidential buildings.

One possible thing that the Commission might conclude is it might conclude that it would like to have more authority related to regulating those buildings. And one possibility might be that there might be a point of sale requirement. To say with any assurance that that's where we would end up is a giant step without basis. We would need to thoroughly investigate that, involve all the parties that would be involved. So sort of expecting that that is a probable outcome of that, I think, is stretching it quite a bit.

We do have the authority to regulate buildings through alteration requirements, and that's an existing authority that is clearly ours. And, you know, it seems to me that that should be the focus of our intention for the 2005 standards.

The parties here may very well want to be actively involved in figuring out what the

Energy Commission should say back to the Legislature by January 1st of 2004, related to other aspects of existing buildings. And that would be useful, and any input about that would be useful. So PG&E's expending funds to make recommendations along that line would be useful. But I don't see that directly related to the 2005 standards.

And I don't know, Bob, if I have said anything out of line there from your vantage point, but --

MR. RAYMER: Not at all. Your technical description of both bills is right on point. It was sort of our hope, as the lead sponsor of 549, that recognizing that we're going through the process that we're going through right now, that a lot a lot of the discussion as it relates to alterations and existing housing stock could also sort of double up as serving as a sounding board for various ideas. That could certainly be carried on into the completion of the report.

And we wanted to extend the time period the Commission had to do that, to make sure that it wasn't going to be more of an impact on current budgetary needs than need be. But you gave a very

good depiction of what the bill was.

MR. PENNINGTON: One of the things that happened during the course of 549 going through the process is we had originally proposed a half a million dollars to do the study, and that was taken out of the bill towards the end of the bill and made it hard for the Governor to decide whether to sign the bill or not sign the bill.

The Governor sent a letter to the Legislature recognizing that the Commission no longer had the funds to do this study. And suggested to the Legislature that perhaps some public/private partnership could be organized that would cofund the work. And so that was a Governor-signed letter to the Legislature.

We may be talking to you about your interest in being involved in a partnership like that in the near future.

MR. LEBER: Gary.

MR. FERNSTROM: PG&E recommends that ATI's proposal be extended to all residential new construction. The diversified demand of electric clothes drying, which is the preponderance of what's installed in residential new construction is about .285 kW during the onpeak period.

It consequently therefore contributes, according to our measurements, to peak load in the state.

If that clothes drying load were converted to gas, which coincidentally is less expensive for customers from an operational point of view, the load would be reduced to only the diversified load of the fan motor as opposed to the much larger heating element load.

Single families do, in the order of three to seven or eight loads per week. And the energy saving and demand reduction would be significant. The cost savings benefit to consumers would be significant relative to the incremental cost of providing gas service to laundry areas as opposed to electric or in addition to electric.

MR. LEBER: Thank you. Lance.

MR. DeLAURA: SoCalGas also supports ATI and PG&E's recommendation to extend that requirement both to new construction as well as retrofit.

We also have a recommendation regarding the retrofit market and the future of time of sale. I think I heard Bill mention that at the

appropriate time the parties, the players would be involved in those discussions.

One of the significant players that we'd strongly recommend you involve as soon as possible is the California Association of Realtors. They're a very big lobby and they have successfully defeated a number of bills related to time of sale related issues.

So the sooner they could be brought on board and getting buy-in I think you'd stand a much greater likelihood of success.

MR. ELEY: Ditto.

MR. TRIMBERGER: Tom Trimberger speaking on behalf of CALBO. This looking at application of standards to alterations is something that we seem to visit every time we look at the standards again.

You know, there's obviously a large potential in a lot of existing homes. The number of existing homes far outweighs new homes. And there's a lot of opportunities to upgrade old technology, old houses.

But we always seem to bang our heads, maybe, Bill, I was hoping you were going to be directly answering this, but there still is

existing California state housing law that says that you can rebuild something, you can repair something exactly the way it was. That is built into law to keep housing affordable.

And every time we come into this we say, gee, wouldn't it be great if we can -- and every time somebody replaces a window have to put in a big expensive one and get the -- or the right one --

(Laughter.)

MR. TRIMBERGER: Sorry about that, Bill.

(Laughter.)

MR. TRIMBERGER: Which, you know, in the long run is usually more cost advantageous to put in the better window, but there's that -- we run into that effect with state housing.

Again, CALBO, speaking as the enforcer of these rules, I kind of wonder how we're going to enforce things. You know, people are allowed to replace a window with the same window without a building permit. Who enforces that? I'm not there. The building official is not there; building inspector is not there.

Same thing for our state housing law, if we're going to require duct ceiling when we change

out a unit. Ducts are not accessible. And this would be something that I would look at as the state housing law says you don't have to touch the existing part of the house when you do one change.

There's also a little bit of concern, you know, we look to provide more energy efficiency when possible. There is a problem. A lot of houses are built with minimum size egress windows. A certain size is required, 24 inch by 22 inch minimum, 5.7 square feet, 44 inches sill height for emergency egress, for fire department staff to get in, for people to get out for fires.

With the replacement windows and an inch and a half taken off of either side of that, that shrinks those considerably. We've had problems with that. We have problems with fire departments not approving that.

So there is a little bit of a concern how we're going to regulate some of this.

And if we're going to require somebody to do duct testing, or duct ceiling when they replace the AC equipment, well, it's going to add to the cost and add to the disincentive to get a permit. It's going to have a disincentive to change out the AC equipment.

Same thing for if we're going to be adding a compliance procedure, if you're going to have to show compliance to replace windows on existing homes. There's going to be a little bit of a disincentive.

So, some of this, you know, there's tremendous potential for energy savings. We need to, you know, in some of these cases, look at it carefully. And I would be interested, you know, this has come up with state housing laws several times that this is just not something the CEC can do.

So, I'm wondering, AB-1574 says look into it. AB-549 says look into possibilities for existing housing, but I don't think that preempts the state housing laws. So I'm kind of looking at you, Bill.

MR. PENNINGTON: We have had a legal review of the question that you're talking about several times. And it's our attorney's conclusion that the state housing law applies to what the Department of Housing and Community Development adopts as regulations, but doesn't apply to what the Energy Commission adopts.

And that the authority that's in the

Warren Alquist Act is clear that we have the authority to establish requirements for alterations.

So that's a difference of opinion we've had, I must say, with HCB in the past. But that's what our attorneys think is the truth.

That doesn't address your other concerns about the enforceability of these things. And the possibility of creating a disincentive by establishing a requirement, a disincentive for people to get permits when you really want them to get permits.

So I think those are good valid issues. I think the conflict that you're suggesting here between state housing law and the Public Resources Act is not really a constraint. But the other things you mentioned are serious considerations, I think.

MR. WARE: Dave Ware, Owens Corning, NAIMA. Bill, there are differences between 549 and 1574, and you primarily talked about 549.

There certainly is a real need to get stakeholders involved in that, and I think that we want to be involved, and I think, you know, selectively amongst the stakeholders -- enough

resources to insure that there's a good development of a good rapport, because there's so much to be gained by that.

There were, in the 1574 processes, the Department of Real Estate, quite frankly the main people who really defeated the ultimate goal of that bill. And notwithstanding it's important to get them involved in this, but 1574 bill -- where the -- I think we had people on notice where we're going after; 549 will help us get there.

But you didn't really talk about 1574. Is there some synergy between the two? I mean -- see some synergy, but I mean has the Commission even talked about where they may go with the provisions of 1574?

MR. PENNINGTON: I think there's a relationship between the two bills, and probably the combination of them you could say was a fairly clear legislative intent that the Commission should be looking at existing buildings.

There wasn't any requirement in 1574 for the Commission to do anything specifically. And we're, you know, we've got requirements that, you know, are way up here right now.

So we haven't developed plans for doing

things that 1574 gives us the discretion to do. So at this point we don't have a specific plan for how we might develop consumer information related to existing buildings. Maybe that might be a natural outgrowth out of the 549 investigation. Maybe information is an important thing that ought to be done, and we'll conclude that out of the 549 thing. And say, you know, we have the authority under 1574 to go produce a certain kind of information. I don't know, I'm just kind of speculating what might happen. I don't know. Is that responsive?

MR. WARE: Yeah, that's fine. There's a lot of support for looking at alterations, and I think there's a good relationship between the support you have here today under the issue of alterations. And, again, the provisions and directions those two bills are trying to get at, and -- come to later --

MR. LEBER: Nehemiah, you had a comment?

MR. STONE: Yeah, a few things. First on the same subject, Bill, before you go. I seem to remember last time you mentioned something about having a parallel process to deal with that report. Is that -- did I misunderstand, or are

you looking at that process? And if so, when does it begin?

MR. PENNINGTON: The standards we're trying to get done by November 2003, and this report's due six months later. So we're going to have to parallel process somehow.

MR. STONE: Okay, but my question remains. Is there a kickoff for that process? You're asking for public input.

MR. PENNINGTON: At this point, no.

MR. STONE: Okay. All right, well, the rest of the questions aren't for you.

Question for Mr. Turley. You put up some information about cost effectiveness of the gas hookup, and it wasn't clear to me whether that included the cost of venting, as well as gas piping. Because you can get away without actually having exterior venting for electric dryer; you cannot get away with that with a gas dryer. Did it include that?

MR. TURLEY: No, we haven't gone to that depth at this point now. We just looked at a tradeoff assuming the venting was an equal. So we compared the gas versus electric, we did not include the venting at this point.

MR. STONE: Okay.

MR. TURLEY: So that will have to be considered in more detail.

MR. TRIMBERGER: I believe California Mechanical Code requires venting for both, so the venting is the same.

MR. STONE: Well, except for electrical. If you have an electric dryer you can get away with just having a window or a ceiling fan. For a gas dryer --

MR. TRIMBERGER: No, that's incorrect.

MR. STONE: That changed since I was a building inspector, then.

SPEAKER: Yeah, but weren't you up way north?

(Laughter.)

MR. STONE: That's true, whole different code, that's right.

On a different topic, you know, we've been talking about who you need to pull into the process when you start talking about replacement and additions, et cetera.

Ten years ago we tried to get the replacement window industry within the code. And we went ahead, we didn't talk to them, we just

adopted it in the code. And before we actually got, you know, the next step, something hit the fan.

MR. RAYMER: Big time, yeah.

MR. STONE: Yeah, big time. And we had to back up and say, well, no, we didn't really mean that, let's redefine what we actually meant, because it was too late to change the code.

And so then we had to go meet with the replacement window folks and they promised that they would be ready to be included in the code by 1998. To my knowledge nobody has taken these issues to them in the meantime.

Given what happened in '91/92 I highly advise that the Commission make a very strong effort to get the replacement window folks, because they're not the same folks as, you know, the typical AAMA members. It's a whole different group.

MR. RAYMER: They were largely Bay Area, right? I think there was a huge contingency of Bay Area --

MR. STONE: Well, the ones who got real vocal were, yes. Yeah.

And then the last question is for Bruce.

You were talking about changes to the ACM model. The only one I really heard you talking about was dealing with slab.

One of the issues that's come up over and over today in different ways is whether radiant barriers are properly handled. And it seems to me that I remember that we never did get the algorithms right for how the radiant barrier interacts with ducts in the attic, what the impact is on that. We kind of put this as -- that's in ASHRAE 152, I think I have the number -- probably have the number wrong, actually.

Okay, so the question is if we're going to be upgrading all the algorithms anyway that would be one that seems, you know, if we can get how radiant barriers actually affect the losses from the ducts in the attic, it seems to me that would be a tremendous advantage towards solving a lot of the issues that have come up about radiant barriers.

MR. WILCOX: Yeah, well, that's a complicated issue. There's a procedure in the ACM manual now for radiant barriers, which was developed 10 or 12 years ago probably. And at the time it was developed it represented the sort of

best thinking and consensus in the industry of what should be done.

MR. ELEY: Well, it was the federal DOE bulletin --

MR. WILCOX: Yeah, and it was primarily, I mean I think at that point the emphasis was mostly on heating.

MR. ELEY: It was.

MR. WILCOX: Rather than cooling. And so in the AB-970 process we did not change any of that.

So, I think it's clearly arguable that it could be updated. I guess the question is whether -- and I think that's sort of implied in what the radiant barrier proposal was earlier, that they wanted to do that. I guess the question is how far we go with that, and whether it's worth opening up all that stuff again.

I think the other angle on that is that we don't have currently a procedure for cool roofs, either, in residential. And we're now, in AB-970 we decided to say that a cool roof was the same as the radiant barrier. That's a stretch. If radiant barriers aren't even right, then we're really stretching.

So I think clearly something could be done there, although I think you could also argue on the cool roof side that we don't actually have enough information about how cool roofs work in California houses to be able to make a model at this point.

MR. ELEY: Just to follow up on that. I mean to accurately model either cool roofs or radiant barriers or both you really have to model the attic, I think. And we don't do that now.

MR. WILCOX: I disagree with Charles. I think we can made a compliance model for cool roofs and radiant barriers without modeling the attic. But it's not a trivial --

MR. LEBER: We're going to lock Charles and Bruce into a room and --

(Parties speaking simultaneously.)

(Laughter.)

MR. LEBER: -- see if they're violently in agreement.

Other comments?

MR. MATTINSON: This side of the room?

MR. NITTLER: I'd just like to comment on the suggestion about using DOE2 for residential compliance. Don't want to get too far into the

details or sound too self serving, but I will.

(Laughter.)

MR. NITTLER: No more self serving than the proponents suggesting that DOE2 should be the tool. I just want to say this, I think the standards have been well served by the use of the current tools for the reference, and also as an implementation tool.

There's years, just like there's years of effort behind the many good models in DOE2, there's years of effort behind our current reference tools in the residential side on issues related to implementation. And all these rules in the ACM that are specific to our residential standards. That has great value.

The compliance printouts have great value. The familiarity and the hundreds of energy consultants using these tools have great value.

And if the process allows us there'll be many more years where the standards are well served by the current reference tools. Thank you.

MR. LEBER: Thank you.

MR. ELEY: Could I ask a follow up question on this subject?

(Laughter.)

MR. ELEY: Actually I guess it's a -- I don't think there's a reason why DOE2 couldn't be approved right now.

MR. GATES: As far as I know there isn't.

MR. ELEY: Okay. So it could be used, now, if someone just went to the trouble of jumping through the hoops and getting it approved.

MR. LEBER: I think it turns out there probably is that. There's a couple of the hoops that might be constraining, but one should try to identify what those are specifically and let us know. And as the ACM manual is coming up for the work on it, there's an opportunity here to be able to fix some of those details so that it turns out that it won't be constraining.

But I believe at the moment it's constraining. And we could probably -- be very useful to have some detailed input just on which pieces of the ACM manual turn out to be constraining.

MR. GATES: Just a quick question just following up on that. If you have a model such as DOE2 that does a very detailed calculation, you then compare it to the reference ACM, which does a

very simple calculation, there's a deviation between the two that is predicted, then how does something like that get resolved?

For example, even DOE2.2 versus 2.1E; 2.1E right now is the reference program. In 2.1E you simulate pipe and duct losses by changing the efficiency of the equipment. Well, 2.2 directly simulates pipe and duct losses.

So the question then is if 2.2 does a better job of that -- to expand on further, currently, I'm doing some very extensive research on the chiller models in the program. And the models, two months from now, will be capable of looking at considerably more than the 2.1E models.

And as a result of that it will predict different numbers. For example, 2.2 will be able to look at chillers with variable speed drives. And those are very temperature sensitive, you know, the differential between the evaporator and the condenser has a profound effect on the chiller efficiency.

So the new algorithms will simulate that. The old ones do not. So if you then do a comparison you will find the difference.

MR. LEBER: The question that you

described on this one item, I think, took something resembling two minutes. And the answers to get to a lot of these I think is going to take some hours.

And so I don't think that we really want to get into a lot of detail about how you deal with all of those pieces.

I mean currently it's you pass the test or you don't. And if you can pass the test you can get approved now. And, you know, it's that simple.

MR. WILCOX: I think, Steve, there's several different issues. One is if you have a better model then the option is to come in and show that your model represents reality better. And that the ACM test then should change and be based on your model and not the current model, and everyone else has to change their model to match.

The fundamental assumption behind the ACM test is that there aren't two right answers to the question of what the effect of a variable speed drive is. That you ought to get a reliable answer to that in the compliance process.

And so, you know, that doesn't mean they can't evolve that system and change it and make it

better, it just means they shouldn't get a better answer out of one program than you get out of another program.

MR. LEBER: And that it takes a rulemaking to make that change. And so I mean there is an opportunity here to change the ACM manual to try to adapt to these things, but between rulemaking changes, then you have to pass the test, and you have to find some way of doing that.

MR. GATES: And there's a lot of those types of issues that affect the TDVs also. For example, daylighting, the way it's currently handled in the ACM. You get a credit that applies to your lighting system, and that credit applies at all hours, even at 10:00 at night, if you're running the lights you get a daylighting credit even though the sun's been down for three hours.

MR. LEBER: That's very nice. This qualifies as a loophole, yes.

(Parties speaking simultaneously.)

MR. LEBER: We recognize that there are a lot of opportunities to change things, and we'd appreciate all the assistance we can get.

Bill.

MR. MATTINSON: As much as I'd like to spend the rest of the night talking about DOE2 and what it can do, I did have a couple comments, and while that was going on it allowed me to think of one or two more, --

(Laughter.)

MR. MATTINSON: -- which I'll be very brief. Ken mentioned that PG&E is working on an implementation enhancement effort. And I just wanted to say two real brief things to that.

One is as both a compliance consultant and as someone who's been involved in standards changes, one of the single best things that happened is getting the proposed documents in PDF format and the standards and the manuals in PDF, so that we can search through without knocking ourselves down for different versions of the manuals of which we've had dozens. So that's great.

In relation to that directly someone put together a PDF file of all the commenters templates and it came out in one file to some of us, anyway, and that was terrific, not to have to download them one by one off the website. That was an immense help.

The second topic is I wish everyone had stuck around here, that's because this has been, so far, anyway, the best implementation proceeding I've ever seen. The approach that's been taken.

Well, first off, it's unlike last time and even other times where we weren't under the AB-970 gun, it's not like we've got to approve this today because it's due tomorrow. We've got some time; we've had a proceeding with guidelines; we've had templates. I appreciate that. I think everybody here does. Everyone I've talked to has.

I'm not really trying to curry any favor here, it's just fact. This has been really nice.

(Laughter.)

MR. MATTINSON: And then the third one, and perhaps the most important one, is where the heck are we going next? There's a whole bunch of time before the next real activities.

Is the Commission Staff going to propose that some of these templates made the cut and some didn't? Or are we all on track to proceed with all 115 templates with more data? Or could you give us just a little guidance there?

MR. WILCOX: We're going to divide the templates up to everyone in the room and everyone

gets their share to do.

MR. MATTINSON: Okay --

MR. LEBER: But you cannot work on a template that you're interested in.

(Laughter.)

SPEAKER: Or, Bill, you can't work on any that you know anything about.

MR. MATTINSON: Yeah, that's important.

(Laughter.)

MR. LEBER: Do we have a bunch of other questions here before I try to answer that one?

MR. PROCTOR: Can I ask something that goes way back, I think, to the very first thing. And I've been looking at this all day trying to figure this out. Do you mind if I go back to TDV for a second?

MR. MAHONE: Let him answer that question first.

MR. PROCTOR: You want to answer Bill's question first? Then everybody can leave and I can ask --

(Parties speaking simultaneously.)

MR. PROCTOR: Okay, never mind, I withdraw my question.

MR. LEBER: All right. Tony, did you

have something?

MR. PIERCE: Yeah, I just had a real brief one -- going back to this morning's discussion and Charles' proposal to make houses -- glass houses --

(Laughter.)

SPEAKER: You really explained that one well, Charles.

MR. ELEY: It was Bruce, anyway.

MR. PIERCE: -- to consider changing the metric from window to floor area to window to walls --

MR. LEBER: That was proposed today.

MR. ELEY: For multifamily --

MR. LEBER: For at least something in --

MR. PIERCE: Would that, you know, --

MR. LEBER: That brings a different set of problems with it, you know. So if you want to change the character of the issues you're trying to deal with you can go that way.

MR. PIERCE: Well, actually I was thinking of it in context of Bruce's comment about how does the building inspector go out and validate the 28 percent glazing area. And it was that ratio to floor area it's much more difficult.

They have a chance maybe against the wall area.

MR. LEBER: They still have to figure out the area of the windows, you know, which is --

MR. ELEY: The window area thing I don't think is ever done in field. I mean it's done during plan check. And then you just, in the field you just make sure they build what's on the plans.

MR. LEBER: More or less.

MR. ELEY: Well, more or less.

(Parties speaking simultaneously.)

MR. PIERCE: -- window to wall area. I don't know the history back when it was established that way, but it seems like more and more houses have vaulted ceilings --

MR. WILCOX: You need more windows then, right?

MR. PIERCE: You have more windows.

SPEAKER: So it can use more energy.

(Laughter.)

MR. LEBER: And if they have that they can get more windows. And the more windows they want they'll just have to add more wall, and then they're in good shape.

MR. MATTINSON: Since we're having a

free-fall on that, the floor area usually at least appears on the plans. The wall area does not show up anywhere in the submittal.

MR. ELEY: That's true.

MR. STONE: No, but what does show up, Bill, is you have a window schedule that says where they are, and you know, if the building inspector has time, which isn't true for every inspection, but they have time, they go through and they take a look, well, yeah, the windows that you said you were going to put in actually are here, rather than 16 extra windows.

MR. MATTINSON: Yeah, and that has to do with egress and all the other things they're checking, too. I agree, they do look at the windows. And as someone said, they -- Charles said, they check to make sure that the ones that are on the plans are basically the ones that are installed. I'll let the expert talk to that.

MR. TRIMBERGER: Yeah, basically it's a plan review issue, and at that time, you know, you're going to be checking windows and framing around them, other issues, as far as the window sizes. And that's where the window size is checked. And you can add those up and divide by

the floor area. It's not that big a thing.

If you go to a wall area then you've got to calculate the wall area, the gross wall areas, the net wall area. It just starts some other problems perhaps.

MR. LEBER: If there are no other questions I can -- there's another question.

MR. MATTINSON: You can answer mine, too, right?

MR. LEBER: Which one? The one that you asked that I wasn't answering?

MR. MATTINSON: Yeah, like what's next?

MR. GATES: I've got a question for the gentleman from CALBO. I wasn't aware that actually in '97 UPC changed piping sizes? Can you, in a minute, just briefly summarize what the impact of that is?

MR. TRIMBERGER: Yeah, I don't know that it merits a whole lot of time. I could talk to you afterwards, also. But basically they've recognized that the old studies that we've been using since the early 1900s aren't quite up to speed.

They've allowed lower fixture units based upon lower flow rates for some fixtures.

And also they've looked not only, you know, is it a water closet in a home, or is it a water closet in a, you know, assembly use.

Provides different demand rates so it's a fixture of flow rate and demand rate. And it pseudo-scientifically comes out with a fixture unit.

MR. GATES: Is that code affecting construction as you see it in California homes at this point?

MR. TRIMBERGER: Yes.

(Laughter.)

MR. LEBER: Gary.

MR. FERNSTROM: While you're on the subject of what comes next, unless I made a mistake when I was looking at my calendar, the January 21/22 workshops that are scheduled, one of them is coincident with Martin Luther King's birthday, which is a holiday for some folks.

MR. LEBER: Good, we'll keep that one.

(Laughter.)

MR. LEBER: Well, I mean a lot of these workshops that we have out here, I think, at this point are still tentative; as far as I know, we haven't sent out a formal notice on those

workshops yet.

MR. ELEY: That one especially is a soft date.

MR. LEBER: And so a lot of it depends on what it is we can do. Certainly we have a lot of templates that are on the table, and I think it's only reasonable to say, no, everything's not going to make it, because we just don't have the resource to include everything.

And so the first cut in an exercise here is that really the staff has to sit down and go through these, which is not something we're looking forward to. And try to sort out in some sort of ranking order, you know, which ones are more important and which ones aren't, and which ones get the state more benefit, and which ones don't. Which ones match with commitments we've already made, you know, which ones aren't in those commitments.

And, you know, try to mix all of those together and rank everything that we have in front of us. We'll try to group them, and to the degree that things group nicely with other things that, you know, we're planning on doing already, then it's a higher probability that that one might get

wrapped in.

And then once we've gone through that exercise, then we need to sit down with our contractor and see whether or not we have enough resources to actually do anything with those. You know, or how far down that ranking we can actually work on things.

And that's going to probably take us, you know, a few weeks here. And at some point there's, you know, part of the contract is to produce a report that, in a sense, kind of wraps in where we are, and will lay out the tasks pretty much where the rest of the project's going to go.

And a piece of that has to be constrained by those things of what we can, you know, possibly get through, and have the resources to do.

You say we have time, but time is feeling very short to us, that we really, you know, it's going to take a lot of effort to try to get through these pieces, and then to try to get the analysis done on time to try to have another, you know, what the next workshop would be.

My guess is that we might probably won't make it in January, and that we just have too many

things to get done between now and then, that it will probably be, at best, February. But that's about the best we know of at this time.

We're not prepared at this point to say that we're going to give up on being able to hit, you know, having the standard proposed by July 1 of next year. But we've got a lot of work to do if we're going to hit that.

So now that I've told you more than I know, is there anything else you wanted?

MR. MATTINSON: That's it, thanks, Jon.

MR. STANONIK: There was one template that hadn't been discussed and I was trying to figure at what point I'd raise my issue since I came all the way across the country.

But anyhow there is a template that suggests that the Energy Commission should pursue water heater efficiencies for residential water heaters above the federal minimum, and then pursue exemption from federal preemption.

I would --

MR. LEBER: That really is an appliance issue, not really a building standards issue.

MR. STANONIK: Well, the template's there.

MR. LEBER: I recognize there was that template floating around somewhere. I thought we pulled that out of the final group that we had.

MR. STANONIK: Well, it's in the pack I had.

MR. MAHONE: Yeah, maybe since I think that was one of our templates, maybe I could answer you, Frank.

As said, this is primarily an appliance standard issue, and the Commission has an appliance standard proceeding underway. And it's dragging on longer than we had expected it would. But before the Commission can pursue an exemption to the NAECA requirements, they have to get it all adopted, and then they have to prepare the application for exemption and move forward with it.

And the PG&E team had written up a template saying that we would be prepared to support that study. Unfortunately, as we were writing it up it became clear that it wasn't obvious at this point in time just what it was going to take to support that effort.

And furthermore, it became fairly clear that whatever effort was required to support that

would probably take place next year, which is -- or next budget. It was sort of beyond the limit of our current budget project.

So we, for those reasons, decided to drop that as a part of PG&E's current package of efforts.

I think --

MR. STANONIK: So it's not part of this rulemaking?

MR. MAHONE: It's not part of this rulemaking.

MR. LEBER: So I beat you to it. I guess I already dropped it out of mine.

MR. MAHONE: Yeah, well, they were way ahead of us.

MR. ELEY: Nothing can happen in this rulemaking on this.

MR. STANONIK: Okay. Thanks.

MR. MAHONE: Sorry you made the trip for --

MR. STANONIK: Oh, no, there's other things.

MR. MAHONE: Okay. Good.

(Laughter.)

MR. MAHONE: Good to see you, anyway.

MR. LEBER: Anything else? If not, I will declare this meeting adjourned. Certainly thank you all for coming, it's been a pleasure.

And -- what?

SPEAKER: Mr. Proctor's question?

MR. PROCTOR: No, that's all right, I have --

MR. LEBER: Mr. Proctor is going to go have a private conversation --

MR. PROCTOR: -- I have a consultant that's going to answer it.

MR. LEBER: And we will see you next time.

(Whereupon, the workshop was concluded.)

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CERTIFICATE OF REPORTER

I, KEN MOORE, an Electronic Reporter, do hereby certify that I am a disinterested person herein; that I recorded the foregoing California Energy Commission Workshop; that it was thereafter transcribed into typewriting.

I further certify that I am not of counsel or attorney for any of the parties to said workshop, nor in any way interested in outcome of said workshop.

IN WITNESS WHEREOF, I have hereunto set my hand this 20th day of November, 2001.

KEN MOORE